THE

Horticulturist,

AND

JOURNAL OF RURAL ART AND RURAL TASTE.

A Few Words on Fruit Culture.

BY far the most important branch of horticulture at the present moment in this country, is the cultivation of Fruit. The soil and climate of the United States are, on the whole, as favorable to the production of hardy fruits as those of any other country—and our northern states, owing to the warmth of the summer and the clearness of the atmosphere, are far more prolific of fine fruits than the north of Europe. The American farmer south of the Mohawk, has the finest peaches for the trouble of planting and gathering—while in England they are luxuries only within the reach of men of fortune, and even in Paris, they can only be ripened upon walls. By late reports of the markets of London, Paris and New-York, we find that the latter city is far more abundantly supplied with fruit than either of the former—though finer specimens of almost any fruit may be found *at very high prices*, at all times, in London and Paris, than in New-York. The fruit grower abroad, depends upon extra size, beauty, and scarcity for his remuneration, and asks, sometimes, a guinea a dozen for peaches, while the orchardist of New-York will sell you a dozen *baskets* for the same money. The result is, that while you may more easily find superb fruit in London and Paris than in New-York—if you can afford to pay for it—you know that not one man in a hundred tastes peaches in a season, on the other side of the water, while during the month of September, they are the daily food of our whole population.

Within the last five years, the planting of orchards has, in the United States, been carried to an extent never known before. In the northern half of the Union, apple trees, in orchards, have been planted by thousands and hundreds of thousands, in almost every state. The rapid communication established by means of railroads and steamboats in all parts of the country, has operated most favorably on all the lighter branches of agriculture, and so many farmers have found their orchards the most profitable, because least expensive part of their farms, that orcharding has become in some

parts of the west, almost an absolute distinct species of husbandry. Dried apples are a large article of export from one part of the country to another, and the shipment of American apples of the finest quality to England, is now a regular and profitable branch of commerce. No apple that is sent from any part of the Continent will command more than half the price in Covent Garden market, that is readily paid for the Newtown Pippin.

The pear succeeds admirably in many parts of the United States—but it also fails as a market fruit in many others—and, though large orchards have been planted in various parts of the country, we do not think the result, as yet, warrants the belief that the orchard culture of pears will be profitable generally. In certain deep soils—abounding with lime, potash and phosphates, naturally, as in central New-York, the finest pears grow and bear like apples, and produce very large profits to their cultivators. Mr. PARDEE'S communication on this subject, in a former number, shows how largely the pear is grown as an orchard fruit in the state of New-York, and how profitable a branch of culture it has already become.

In the main, however, we believe the experience of the last five years has led most cultivators—particularly those not in a region naturally favorable in its soil—to look upon the pear as a tree rather to be confined to the fruit-garden than the orchard; as a tree not so hardy as the apple, but sufficiently hardy to give its finest fruit, provided the soil is deep, the aspect one not too much exposed to violent changes of temperature. As the pear tree, (in its finer varieties,) is more delicate in its bark than any other fruit tree excepting the apricot, the best cultivators now agree as to the utility of sheathing the stem from the action of the sun all the year round—either by keeping the branches low and thick, so as to shade the trunk and principal limbs—the best mode—or by sheathing the stems with straw—thus preserving a uniform temperature. In all soils and climates naturally unfavorable to the pear, the culture of this tree is far easier upon the quince stock than upon the pear stock; and this, added to compactness and economy of space for small gardens, has trebled the demand for dwarf pears within the last half dozen years. The finest pears that make their appearance in our markets, are still the White Doyenne, (or Virgalieu,) and the Bartlett. In Philadelphia the Seckel is abundant, but of late years the fruit is small and inferior, for want of the high culture and manuring which this pear demands.

If we except the neighborhood of Rochester and a part of central New-York—(probably the future Belgium of America, as regards the production of pears,) the best fruit of this kind yet produced in the United States, is still to be found in the neighborhood of Boston. Neither climate nor soil are naturally favorable there, but the great pomological knowledge and skill of the amateur and professional cultivators of Massachusetts, have enabled them to make finer shows of pears, both as regards quality and variety, than have been seen in any part of the world. And this leads us to observe that the very facility with which fruit is cultivated in America—consisting for the most part only in planting the trees, and gathering the crop—leads us into an error as to the standard of size and flavor attainable generally. One half the number of trees well

cultivated, manured, pruned, and properly cared for, annually, would give a larger product of really delicious and handsome fruit, than is now obtained from double the number of trees, and thrice the area of ground. The difficulty usually lies in the want of knowledge and the high price of labor. But the horticultural societies in all parts of the country, are gradually raising the criterion of excellence among amateurs, and the double and treble prices paid lately by confectioners for finely-grown specimens, over the market value of ordinary fruit, are opening the eyes of market growers to the pecuniary advantages of high cultivation.

Perhaps the greatest advance in fruit growing of the last half dozen years, is in the culture of foreign grapes. So long as it was believed that our climate, which is warm enough to give us the finest melons in abundance, is also sufficient to produce the foreign grape in perfection, endless experiments were tried in the open garden. But as all these experiments were unsatisfactory or fruitless, not only at the north but at the south—it has finally come to be admitted that the difficulty lies in the variableness, rather than the want of heat, in the United States. This once conceded, our horticulturists have turned their attention to vineries for raising this delicious fruit under glass—and at the present time, so much have both private and market vineries increased, the finest Hamburgh, Chasselas, and Muscat grapes, may be had in abundance at moderate prices, in the markets of Boston, New-York and Philadelphia. For a September crop of the finest foreign grapes, the heat of the sun accumulated in one of the so called cold vineries—(i. e.—a vinery without artificial heat, and the regular temperature insured by the vinery itself,) are amply sufficient. A cold vinery is constructed at so moderate a cost, that it is now fast becoming the appendage of every good garden, and some of our wealthiest amateurs, taking advantage of our bright and sunny climate, have grapes on their tables from April to Christmas—the earlier crops forced —the late ones slightly retarded in cold vineries. From all that we saw of the best private gardens in England, last summer, we are confident that we raise foreign grapes under glass in the United States, of higher flavor, and at far less trouble, than they are usually produced in England. Indeed, we have seen excellent Black Hamburghs grown in a large pit made by covering the vines trained on a high board fence, with the common sash of a large hot-bed.

On the Ohio, the native grapes—especially the Catawba—have risen to a kind of national importance. The numerous vineries which border that river, particularly about Cincinnati, have begun to yield abundant vintages of pure light wine, which takes rank with foreign wine of established reputation, and commands a high price in the market. Now that the Ohio is certain to give us Hock and Claret, what we hear of the grapes and wine of Texas and New-Mexico, leads us to believe that the future vineyards of New-World Sherry and Madeira may spring up in that quarter of our widely extended country.

New-Jersey, so long famous for her prolific peach orchards, begins to show the effects of a careless system of culture. Every year, the natural elements of the soil needful to the production of the finest peaches, are becoming scarcer and scarcer, and

nothing but deeper cultivation, and a closer attention to the inorganic necessities of vegetable growth, will enable the orchardists of that state long to hold their ground in the production of good fruit. At the present moment, the peaches of Cincinnati and Rochester are far superior, both in beauty and flavor, to those of New-York market —though in quantity the latter beats the world. The consequence is, that we shall soon find the peaches of Lake Ontario outselling those of Long-Island and New-Jersey in the same market, unless the orchardists of the latter state abandon *Malagatunes* and the *yellows*, and shallow ploughing.

The fruit that most completely baffles general cultivation in the United States, is the plum. It is a tree that grows and blossoms well enough in all parts of the country—but almost everywhere it has for its companion the curculio, the most destructive and the least vulnerable of all enemies to fruit. In certain parts of the Hudson, of central New-York, and at the west, where the soil is a stiff fat clay, the curculio finds such poor quarters in the soil, and the tree thrives so well, that the fruit is most delicious. But in light, sandy soils its culture is only an aggravation to the gardener. In such sites, here and there only a tree escapes, which stands in some pavement or some walk forever hard by the pressure of constant passing. No method has proved effectual but placing the trees in the midst of the pig and poultry-yard—and notwithstanding the numerous remedies that have been proposed in our pages since the commencement of this work, this proves the only one that has not failed more frequently than it has succeeded.

The multiplication of insects seems more rapid, if possible, than that of gardens and orchards in this country. Everywhere the culture of fruit appears, at first sight, the easiest possible matter, and really would be, were it not for some insect pest that stands ready to devour and destroy. In countries where the labor of women and children is applied, at the rate of a few cents a day, to the extermination of insects, it is comparatively easy to keep the latter under control. But nobody can afford to catch the curculios and other beetles at the price of a dollar a day for labor. The entomologists ought, therefore, to explain to us some natural laws which have been violated to bring upon us such an insect scourge—or at least point out to us some cheap way of calling in nature to our aid, in getting rid of the vagrants. For our own part, we fully believe that it is to the gradual decrease of small birds—partly from the destruction of our forests, but mainly from the absence of laws against that vagabond race of unfledged sportsmen who shoot sparrows when they ought to be planting corn, that this inordinate increase of insects is to be attributed. Nature intended the small birds to be maintained by the destruction of insects, and if the former are wantonly destroyed, our crops, both of the field and gardens, must pay the penalty. If the boys must indulge their spirit of liberty by shooting *something* innocent, it would be better for us husbandmen and gardeners to subscribe and get some French masters of the arts of domestic sports, to teach them how to bring their light artillery to bear upon Bullfrogs. It would be a gain to the whole agricultural community—of more national importance than the preservation of the larger birds by the game laws.

We may be expected to say a word or two here respecting the result of the last five years on pomology in the United States. The facts are so well known that it seems hardly necessary. There has never been a period on either side of the Atlantic, when so much attention has been paid to fruit and fruit culture. The rapid increase of nurseries, the enormous sales of fruit trees, the publication and dissemination of work after work upon fruits and fruit culture, abundantly prove this assertion. The pomological congress which held its third session last year in Cincinnati, and which meets again this autumn in Philadelphia, has done much, and will do more towards generalising our pomological knowledge for the country generally. During the last ten years almost every fine fruit known in Europe has been introduced, and most of them have been proved in this country. The result, on the whole, has been below the expectation; a few very fine sorts admirably adapted to the country; a great number of indifferent quality; many absolutely worthless. This, naturally, makes pomologists and fruit growers less anxious about the novelties of the nurseries abroad—and more desirous of originating first rate varieties at home. The best lesson learned from the discussions in the Pomological Congress—where the experience of the most practical fruit growers of the country is brought out—is, that for every state, or every distinct district of country, there must be found or produced its improved indigenous varieties of fruit—varieties born on the soil, inured to the climate, and therefore best adapted to that given locality. So that after gathering a few kernels of wheat out of bushels of chaff, American horticulturists feel, at the present moment, as if the best promise of future excellence, either in fruits or practical skill, lay in applying all our knowledge and power to the study of our own soil and climate, and in helping nature to perform the problem of successful cultivation, by hints drawn from the facts immediately around us.

A GLIMPSE AT THE GARDENS OF RIO.

BY W. J. H., LOCK-HAVEN, PA.

Dear Horticulturist—Allow a new but gratified subscriber to encumber a few pages of your incomparable monthly, in endeavoring to describe some of the beauties of a tropical climate, as seen during a recent voyage round the world.

Brazil is beyond doubt the loveliest country on this continent, and I think can scarcely be surpassed by any other in the world. Rio de Janeiro, with a motley population of two hundred thousand, boasts, and justly too, of her public and private gardens, but it is of the former we are about to write. They are called the *Imperial* and the *Botanical Gardens*, and are greatly resorted to by the citizens, who are real lovers of nature; and a stranger is told here, as they are by the Italians "who has not seen Rome, (i.e. in Rio the gardens) has seen nothing." They are indeed well worth a visit, and I shall never forget the impression they made on me when I saw them for the first time, having just left our snow-clad country, and our friends shivering in a March wind, to be thus suddenly translated to this earthly paradise.

Having selected a carriage, from the hundreds congregated about the palace, the driver,

or more properly postillion, being remarkable for his gaudy livery and big boots, our sable Jehu was persuaded to transfer himself from a recumbent position inside the carriage, to his saddle, and after some delay, off we started, our ponderous vehicle rolling under the arches of the imperial dwelling, which spans the Rua Direta. Soon after leaving the palace, the magnificent bay of Boto Fago suddenly burst upon our view, its large waves rolling on the snow-white strand with a sudden roar. Then we drove through street after street, every now and then catching a glimpse of small but beautiful bays, until we came again to the beach, while the small sail boats at a distance, danced and bobbed like white sea fowls.

Corcovado Peak soon was seen rearing his sharp and lofty head to the clouds, and at whose base lay the Botanical Gardens, surrounded by an impenetrable hedge, teeming with small white flowers. On entering we came across large beds of the tea plant, and beyond, were rows and groups of majestic trees both foreign and indigenous; bread fruit, cocoa nut, clove, cinnamon, (I omit scientific names) and hundreds of others. Then on each side of the white and smoothly rolled walks, stood rows of the stately palm, with their rings showing each years growth, and between them, golden pine apples nestling in the bosom of their long green leaves. After spending several hours in this beautiful place, we were shown into an adjoining garden devoted to the culture of oranges, lemons, limes, plantains and bananas. A more lovely spot than these gardens does not exist on this continent, and after spending days of admiration and botanical delight in them, I feel that I can never do them justice in any description. Groups of bambo, nodding in solemn and *oriental* grandeur, greatly diversified the picture, with their refreshing greenness.

Delightful cool summer houses, pavillions, and rustic retreats, shaded with the richest climbing evergreens, and covered with myriads of gorgeous flowers, of all the colors of the rainbow; playful sparkling fountains, reflecting the golden lines of a tropical sun; murmuring rivulets, flowing peacefully over pebbles and shells, then leaping down in minature cascades, and dashing off to be lost in a beautiful thicket of laurels, make up the *ensemble* of this enchanting scene.

Parts only of these lovely gardens are kept in good order, some portions being left in a state of nature, and utter neglect. A more romantic spot I never saw, and my mind unconsciously transferred me to those scenes so beautifully described by the ancient classical authors, and good old FENELON, and all that seemed to be wanting, were the nymphs, and mermaids, the dryads and fauns, to give more animation to the groves and streams.

Yours, &c. W. J. H.

Lock Haven, Pa.

TREE PÆONY GARDENS IN CHINA.

BY R. FORTUNE.

LEAVING the south garden described in my last letter, I walked onwards to the Moutan Nurseries. They are situated near the village of Fa-who, about five or six miles west of Shanghae, and in the midst of an extensive cotton country. On the road I met a number of Coolies, each carrying two baskets filled with Moutans in full flower, which were on their way to the markets for sale. When I reached the gardens I found many of the plants in full bloom, and certainly extremely handsome. The purple and lilac-colored kinds were particularly striking. One, a very dwarf kind, and apparently a distinct spe-

cies, had finely cut leaves, and flowers of a dark velvety purple, like the Tuscany Rose of our gardens. This the Chinese call the "black" Moutan, and I believe it is the same which Dr. Lindley has described in the Journal of the Horticultural Society, and named P. atrosanguinea. Another kind called the "tse," or purple, has double flowers of a large size: this is probably the variety reported to have 1000 petals, and which is said to exist only in the garden of the Emperor. The third is called the "lan," or blue: this is a lilac variety, with flowers of the color of Glycine sinensis. There are others of various shades of purple, perfectly distinct from these, and equally fine.

The double whites are also numerous and handsome. The largest of these Dr. Lindley has named P. globosa, but there are four or five others nearly as large and double. Some of them have a slight lilac tinge, which gives a richness to the color. The most expensive is one called "wang," or yellow, by the Chinese: it is a straw-colored variety, rather pretty, but not so handsome as some of the others.

The reds, (Hong,) are also numerous. Curious enough, those kinds which are common in Canton and England, are rare here. There are about half a dozen of new varieties of reds in these gardens: one of them, called "Van-yang-hong" by the Chinese, is the finest flower I ever saw. The flowers are of a clear red color, unlike any of the others, perfectly double, and each measures about ten inches across. Altogether I numbered about thirty distinct varieties in these gardens.

Nearly all these fine varieties of the Moutan are quite unknown in Canton. This may seem strange in a country where the people are proverbially fond of flowers, but the Chinese are so machine-like in all their movements, that after a little acquaintance with them, we cease to wonder at the apparent anomaly. The fact is, the Canton gardens are supplied with Moutans by another district, which lies much farther to the west than Shanghae. From time immemorial the same gardens have supplied these flowers; they came always by the same road, and at the same time of the year. Shanghae, until the close of the last war, never seems to have had any connection with Canton, in so far as flowers were concerned, consequently these fine varieties of the Tree Pæony never found their way to the south, and from thence to Europe.

The Moutan gardens are numerous, but each is upon a very small scale. They look more like cottage gardens than anything else, and are managed in the same way as gardens of this description generally are, namely, by the members of the family. The female part of the community seem to take as much interest in the business as the males, and are very avaricious and fond of money. I invariably found I had to pay higher prices for the plants when they were consulted on the matter. The soil of these gardens is a rich loam, well manured, and thus rendered lighter in texture than that of the surrounding country in which the cotton grows.

The propagation and management of the Moutan seems to be perfectly understood by the Chinese at Shanghae, much better than it is in England. Our nurserymen always complain that they cannot propagate it with facility, and consequently this fine flower is invariably high in price. I will tell you how the Chinese manage the business, in order that your nursery readers may give the system a trial.

In the beginning of October large quantities of the roots of a herbaceous Pæony* are seen heaped up in sheds and other outhouses, and are intended to be used as stocks for the Moutan. The bundle of tubers which forms the root of a herbaceous Pæony is pulled to pieces, and each of the finger-like rootlets forms a stock upon which the Moutan is destined to be grafted. Having thrown a large number of these rootless upon the potting

* A variety with small single flowers.

bench, the scions are then brought from the plants which it is desirable to increase. Each scion used is not more than one and half or two inches in length, and is the point of a shoot formed during the bygone summer. Its base is cut in the form of a wedge, and inserted in the crown of the finger-like tuber just noticed. This is tied up or clayed round in the usual way, and the operation is completed. When a large number of plants have been prepared in this manner, they are taken to the nursery, where they are planted in rows about a foot and a half apart, and the same distance between the rows. In planting, the bud or point of the scion is the only part which is left above ground; the point between the stock and scion, where the union is destined to take place, is always buried beneath the surface. Kæmpfer states that the Chinese propagate the Moutan by budding; but this must have been a mistake, as budding is never practiced in the country, and is not understood. He was probably deceived by the small portion of scion which is employed, and which generally has only a single bud at its apex.

Many thousands of plants are grafted in this manner every autumn, and the few vacant spaces which one sees in the rows, attests the success which attends the system; indeed, it is rare that a graft fails to grow. In about a fortnight the union between the root and the scion is complete, and in the following spring the plants are well established and strong. They frequently bloom the first spring, and are rarely later than the second, when they are dug up and taken to the markets for sale, in the manner I have described. When each has only one stem and one flower bud, it is of more value in the eyes of the Shanghae nurserymen, than when it becomes larger. In this state it is more saleable, it produces a very large flower, and it is easily dug up and carried to the market. I could always buy large plants at a cheaper rate than small ones, owing to these circumstances.

In the gardens of the Mandarins it is not unusual to meet with the Tree Pæony of great size. There was one plant near Shanghae which produced between 300 and 400 blooms every year. The proprietor was as careful of it as the Tulip fancier is of his bed of Tulips. When in bloom it was carefully shaded from the bright rays of the sun by a canvas awning, and a seat was placed in front on which the visitor could sit down and enjoy the sight of its gorgeous flowers. On this seat the old gentleman himself used to sit for hours every day, smoking pipe after pipe of tobacco, and drinking cup after cup of tea, while all the time he was gazing on the beauties of his favorite "Moutan wha." It was certainly a noble plant, and well worthy of the old man's admiration; long may he live to sit under his awning and enjoy such a sight.—*Gardeners' Chronicle.*

THE PHILOSOPHY OF DEW.

BY M. MELLONI.

[THERE are few more beautiful processes in nature than the formation of dew, and few which are so generally misunderstood—"The *falling* dew" being in fact only a piece of pure poetry. The following interesting explanation by M. MELLONI, a European savan of distinction, is the latest and best that we have seen. It was originally published in the *Compte Rendus*, in a more elaborate form, but has been condensed and translated by Dr. LINDLEY, in the following letters. ED.]

FIRST LETTER.

FROM the experiments undertaken by Wells to explain the true cause of dew, it seems quite clear, I think, that dew neither rises from the earth nor falls from the sky, but is

formed by the elastic and invisible vapor which is present everywhere in the atmosphere; the precipitation of aqueous vapor is clearly owing to the cold produced by the radiation of bodies towards a clear sky. Looking at the question in this way, leaves, wood, glass, varnish, lampblack, become covered with dew, because they emit heat easily, and are considerably cooled under a clear sky. Metals, on the other hand, remain dry, in consequence of the difficulty they have in radiating their heat to the upper regions of the atmosphere; and, in fact, a great difference is observed between the indications of a thermoscope, when a vessel of polished metal, full of boiling water, and an exactly similar one coated with lampblack, are successively presented to it; the action of the second being much greater than that of the first. The deduction is correct; but it must be allowed that it does not necessarily appear so to everybody. Indeed, Prevost, and Saussure before him, attributed the absence of dew on metals to an electric force; Leslie explained the same phenomenon by a particular repulsion, which, he said, existed between metallic surfaces and watery vapor; and those who maintained that dew arose from the earth, explained the same thing by the heat and electricity disengaged by the chemical action of metals upon the particles of this same vapor, at the moment of their passage to the liquid state. To show that these hypothesis are untenable, I first take three thermometers with graduated stems, and on each tube I fix a small cork about five or six millimetres above the bulb. This cork helps to support the metallic cases in which the thermometers for experiments on nocturnal cooling, are inclosed. The first case consists of a small, thin, polished silver or copper cup, like a common thimble, and large enough to contain the bulb of the thermometer; the second is a tin cylinder, open at one end and closed at the other; this serves as an envelope for the graduated tube. The two metallic pieces (which can easily be put off or on,) are kept in their places by the elasticity of the cork.

In the next place I procured three tin cups, each having a lateral opening near its bottom, through which the bulbs of the prepared thermometers can be passed, while the stems with their envelopes remain horizontally on the outside. These cups are supported by fine metallic tubes, provided with covers of the same nature, and the whole were exposed to the air on a calm fine night. One of the thermometer cases was blackened, and the other two were in their natural state, and the cups were sometimes open and sometimes shut. Such was the apparatus with which I compared the nocturnal radiation of silver with that of lampblack. Suppose the cups to be first shut, the three thermometers then mark the same temperature. Then by opening two of the cups, and leaving the third, containing one of the bright thermometers, shut, it will be seen that the metallic thermometer which is now exposed to the air, falls so little that hardly any change can be observed, except with the finest instruments; while the thermometer coated with lampblack, falls very visibly, and after a few minutes it will mark three or four degrees less than the thermometer in the closed cup—an evident proof that this difference is owing to the heat radiated by the lampblack, and not at all to the contact of the exterior air, which equally surrounded the polished metallic casing of the other exposed thermometer. My results confirm, in a striking manner, the assertion of MM. La Provostaye and Desains, viz: that the emissive power of metals is much less than the experiments of Leslie, Dulong and Petit, led people to suppose.

The radiating power of lampblack being 100, that of laminated silver I found to be 3.026. MM. LaProvostaye and Desains find 5.37 for silver chemically precipitated on copper, and 2.1 when the silver is polished. According to the last mentioned gentleman, the emissive power of recently laminated silver is 2.94; while 2.38 is that of laminated silver burnished.

From observations made in 1838, I am led to believe that the differences in the radiating power of the polished and the scratched side of the cube in Leslie's famous experiment, is not owing, as was generally thought, to the differences in the mechanical state of the two surfaces, but to a change of density resulting from the scratching. This appears, moreover, to be confirmed by the three following facts: 1st. The variation in the emissive power is only observable in metals; marble, jet, or ivory have the same radiating power whether they are smooth or not. 2d. If silver be melted and slowly cooled in sand molds, then burnished and afterwards scratched with a diamond, so that the bottom of the scratches be compressed and condensed, its radiating power will be less after the scratching than it was before. 3d. This same piece of silver, melted and polished, has its radiating power diminished by being hammered or laminated.

Thermoscopic instruments similar to those described above, and having the cases covered with varnish, black lead, isinglass, sawdust, sand, dust and leaves, constantly indicated a very sensible fall of temperature before becoming moist with dew; the lapse of time between the fall of temperature and the deposit of dew, sometimes amounted to several hours; a fall of temperature, moreover, often occurred without any deposit of dew at all during the night. This last phenomenon occurred the more frequently the higher the thermometers were placed above the ground. By making your observations at a certain height above the soil, you can delay or entirely prevent the deposition of dew on your instruments, and prove conclusively that it always follows and never precedes the production of cold. I have never seen the polished metallic cases of my thermometers covered with condensed vapor during damp nights, provided there was no trace of fog in the atmosphere.

Hence we see, that in order that a body may be covered by dew it must first cool to a certain degree, and the reasons why metals do not become covered with dew, is that they do not become sufficiently cold by radiation. But is there nothing else to hinder the precipitation of dew on metals? In other words, is the feeble radiating power of metals the true and only reason why they are never wetted by dew?

The following experiment seems to me to answer this question, at the same time that it refutes the theories that dew rises from the earth or falls from the clouds, and clearly proves Well's principle: On a tin disc, as large and thin as possible, draw a concentric circle with a radius equal to one-third of that of the disc, and cover it with a thick layer of varnish. Then take another tin disc less by ten millimetres than the varnished circle; and having soldered a pointed iron wire (2 millimetres large and 2 or 3 decimetres long,) at its centre, and perpendicular to it, place the wire through a hole in the center of the great disc on the varnished side. The great disc is to be pushed along the wire until the two discs are about five millimetres from each other, at which distance they must be kept.

The discs so joined are to be taken in the evening out in the fields, and left for a few minutes in a horizontal position, quite out of contact with any other bodies. If the night is calm and fine, phenomena which one might easily foretell will soon be observed on the surface of the larger disc.

It suffices, indeed, to remember that in the position in which the instrument was left, the small disc was uppermost, and hence an annular band of the varnished part of the lower disc will be exposed to the air. Now it is clear that this band will radiate heat, cool, become covered with dew, and will propel cold and dew in consequence, from the side next the center, and from that next the circumference. This propagation will, however, proceed much further in the latter than in the former direction, and for this reason—the points cooled by contact will cool further by radiation, and will become covered with dew,

whilst the varnish beneath the small disc can only cool by contact. And we find that the central part of the varnished circle remains perfectly dry, whereas the outer metallic band is wetted to its very edge, if the atmosphere is exceedingly damp.

But there is another circumstance which we could not so easily have foreseen. I mean the exact repetition of the same appearances on the surface of the disc turned next the ground. Dew begins to appear on this surface exactly opposite the little exterior varnished band; a light whitish circle suddenly appears on the polished metal, and after becoming better defined, spreads little by little, sometimes as far as the edges of the plate in one direction, but never reaches the center, which remains quite dry and brilliant like the corresponding portion on the other side of the disc, and the small circular roof which covers it without touching it.

From this very simple experiment we draw the following conclusions. Dew does not fall from the sky, because the upper disc is always dry, and the greater part of the lower one is wetted. It does not arise from the ground, because if the exterior part of the lower surface of the great disc is covered, the middle part of it remains perfectly dry and brilliant. Metals do not repel aqueous vapor which forms dew, nor do they cause its evaporation, as it is deposited upon them, since we see some parts of the metal quite wet, and others quite dry.

The appearance of the dew first on the uncovered band of varnish, and its gradual extension to the other adjacent and opposite parts of the great disc, together with the fall of temperature observed on the varnished cases of the thermometers exposed freely to the air, prove that dew is a pure consequence of nocturnal radiation, which gives to good radiators the degree of cold necessary for the condensation of the elastic invisible aqueous vapor which pervades our atmosphere.

Thus far all the facts agree perfectly with the generally received theory of dew. In a second letter I shall bring forward others which are not capable of explanation in the usual way, but which, nevertheless, are connected in a fortunate manner to the principle of Wells.

SECOND LETTER.

In this letter I shall show, as I before promised, that although Wells' principle of the origin of dew is correct, it is impossible to explain all the thermometrical and hygrometrical phenomena which are produced during a calm fine night, without taking into account a new circumstance, as yet entirely neglected, which is of the greatest consequence in the nocturnal cooling of bodies. But before proceeding to this point, I shall offer a few remarks on two series of experiments, advanced by those who maintain that dew arises from the soil, and which they say completely refute all theories of dew based upon radiation.

A certain number of thermometers, as nearly as possible equal, both in size or sensibility, are taken, of which some are coated with lampblack, varnish and Indian ink, while others are covered with gold, silver, tin, copper, and leaves of plants. These instruments, thus prepared and exposed to the free atmosphere on a calm fine night, indicated at first temperatures differing a little the one from the other; but after a certain space of time, they all indicated very nearly the same temperature. The experiment was varied—on the ends of glass tubes placed upright in the soil, plates of zinc, copper, glass, were laid; in the center of each of these plates was a depression in which the bulb of the thermometer was placed, while its stem, supported by an iron wire, remained in a vertical position; another thermometer suspended freely between the plates marked the temperature of the air. Here again the instruments, when exposed to the air in the evening, indicated differences,

of temperature which afterwards disappeared, so that at day-break all the thermometers were sensibly at the same height.

These facts appeared to the opponents of Wells' principle completely decisive; and from that time forward they maintained that "the pretended cold which is indispensable for the formation of dew is a pure invention!" But the experiments of these gentlemen were made near the soil, in an atmoshphere charged with moisture; all the tubes of the thermometers were uncovered; and in the last experiment their bulbs communicated by means of the plates, with the tubes supporting them. Now glass, of which these tubes were made, radiates considerably; its temperature falls and the cold acquired is communicated to the bodies touching it; the latter being in a moist atmosphere cause a deposit of aqueous vapor; and we know that water radiates heat and cools as much as glass, lampblack, or varnish. There is then nothing surprising in the fact that the thermometers on the plates marked, after a certain time, the same temperature as those surrounded with better radiating substances. From the fact that the metallic surfaces covered with dew were as cold as the glass or blackened surfaces, we can only conclude that the radiating powers of water, lampblack and glass, are sensibly equal; but we can by no means, from these experiments, say that metals cool on calm fine nights as much as glass or lampblack.

In order to be certain of the true state of things, glass must not be employed; the supports must be made of polished tin, which hardly radiates at all, and which sufficiently isolates the thermometers from the soil; moreover, all the parts of the thermometers must be covered with metal. Then, the metal being polished, the thermometers will give the true temperature of the air; and when the casing is varnished, blackened, covered with leaves or any other substance, we obtain by a simple comparison with the polished thermometer, the degree of cold produced by the radiation of this substance.

By means of such instruments as these, I have found that leaves of plants, glass, varnish and lampblack, always cool on calm fine nights, from one to two degrees below the surrounding air. On looking at the smallness of these differences, one might be led to suppose that the fall of temperature observed by Wilson and Wells, and which amounted to seven or eight degrees, was much exaggerated. But when we remember that in their experiments the thermometers for showing the temperature of the air were raised four or five feet above the earth, while those covered with the radiating substance were close to the soil, we can easily see why their results and my own differ so much. For Pictet has long ago shown that the temperature of the air decreases rapidly, on calm fine nights, as we approach the earth. This fact alone would render the temperature of the radiating substance, placed close to the surface of the earth, lower than that of the air in which the higher thermometers were placed; so that, in this arrangement of the instruments, the difference between the two thermometers by no means indicates the amount of cooling of the body below the surrounding air.

In another of Wells' experiments there was a thermometer covered with wool placed at the same level as a free thermometer, and the difference of temperature observed was 5°,3. Here the wool certainly cooled two or three times as much as the lampblack in my experiments; and I know that the radiating power of wool is not greater than that of lampblack.

To explain the cause of this extraordinary cold observed by Wells, we must first clear up any doubt that may be attached to it. It was for this purpose that I covered a thermometer with wool, and exposed it to the air with two others of the same size, one of which was coated with lampblack and the other with polished metal; in a few minutes the thermometer with the wool fell twice as low as that coated with lampblack. A fourth

thermometer covered with an equal quantity of wool, pressed close to the instrument by means of a metallic wire, gave a result intermediate between the other two. Lastly, I covered a fifth thermometer with two pieces of flannel, and it fell still less than the last. These experiments were repeated, cotton being used instead of wool, and the results were perfectly similar. I then began to suspect that the superiority of the cotton and wool over the lampblack, was owing to a certain modification in the radiating power of these bodies, caused by the presence of the air filling their interstices.

But how can air increase the cold resulting from radiation? The answer is simple. We have known for many years, that the nocturnal cooling of a body does not vary with the temperature of the atmosphere. Thus Capts. Parry and Scoresby state that on calm fine nights in the polar regions, the snow was cooled about 9° below the air four or five feet above it when the temperature of the latter was 0°—or 25°—or 30°. M. Pouillet has found that Swan's down is cooled 7° below the air at 0° or—25°. And I for my part, have found that the blackened or varnished thermometers cool a certain fixed number of degrees, whatever the temperature of the night may be. Now it is clear that the tufts of cotton or of wool spread out on the upper part of the bulb of a thermometer, after having cooled by radiation, will communicate the cold so acquired to the surrounding air, which becomes by this means heavier, will descend in the interior to fall on the ground; but a certain time is required for the passage of this air through the interstices of the wool or cotton. The threads then, of these last, will be in contact with air that is colder than it was at the beginning of the experiment; and as the fall in this temperature below the surrounding medium is invariable, they must necessarily become colder still. This increase of cold will cause a new fall of temperature in the medium; the latter gives rise to another cooling in the radiating body; and so on until the weight acquired by the condensed air is sufficent to overcome the obstacles opposing its exit.

The same phenomena take place naturally in many circumstances. Indeed, plants with hairy leaves are colder than those with smooth ones. The temperature of grass and that of other low plants which clothe the fields, falls, in consequence of this reaction of the air, much below that of elevated bodies, because of their vicinity to the soil which supports the surrounding medium, and compels it to remain in contact with the radiating surfaces. The truth is, that the layer of air by which the grass is surrounded, is not steady; it changes its position, on the contrary, in precisely the same way as water in a vessel over the fire; the particles of air condensed by the cold on the tops of the blades of grass, descend towards the earth, become heated by contact with the latter, and rise again towards the tops of the leaves, and so on; but it is clear that, in spite of this state of motion, the air on the whole cools, and in order that the grass may be of the same constant temperature below that of the surrounding medium, it must cool more still; and thus a gradual cooling and an increasing moisture in the layer of air are caused.

I cannot enter here into all the necessary details to show how the frigorific reaction of the air explains all the facts preceding and accompanying the appearance of dew, and many other phenomena connected with this interesting question, which have not as yet been satisfactorily accounted for. They will all be found, however, in my memoir, which I shall soon, I hope, have the honor to present to the academy.

THIRD LETTER.

My studies on dew seem to me to have proved conclusively, that if Wells' principle is true, the theory known by the same name is erroneous, or at least exceedingly incomplete. I thought that I had stated this proposition so clearly as to leave no room for any misun-

derstanding; but on looking over several periodicals I think that it has been entirely misrepresented. In short, the editors of these papers, having perhaps the same opinion as he who first among them noticed my theory, cite the first part of it, and pass over the second in silence; the reader is hence led to believe that my work tends only to confirm Wells' theory as explained in all treatises on physics and meteorology; while it is precisely to an opposite conclusion that my experiments lead. I shall try to render myself more intelligible by setting out from those data on which the theory is based.

Take two pairs of thermometers enveloped in their metallic case, and hung, by means of metallic threads, in the manner described in my first letter. Suppose that each of these pairs is composed of one thermometer with a polished, and another with a blackened case. Let us suppose lastly, that, on a calm and clear night, one of these pairs be fixed close to the surface of an exposed meadow, while the other be placed four or five feet above the surface, so that the two thermometers of each pair are at the same level.

After a short exposure, the black thermometers will be seen to descend about 1°,5 below the metallic thermometers beside them. However, the temperatures indicated by the lower will be very different from those marked by the upper pair; the difference will amount to five or six degrees, if the night is calm and fine; and as the lower pair of thermometers always indicates the coolest temperatures, we conclude that the differences observed between the indications of the two pairs of instruments, arise solely from the different temperatures of the atmospheric layers in which they are placed; and that consequently, on calm and clear nights, the temperature of the air decreases rapidly as we approach the earth.

Now the experiment on which Wells' theory rests, consists in the often-repeated observation that a common thermometer, placed in contact with the grass, indicates a much lower temperature than a thermometer raised four or five feet above the soil; whence it has been concluded that the grass is cooled many degrees by radiation towards the sky. * * * But it is easy to convince yourself that this conclusion is quite unauthorised. In short, place one of your uncovered thermometers in contact with the grass, and let the other hang freely in the air, at the same distance from the ground, you will find that the two instruments mark the same degree. Now nobody would deny that this is the way to proceed to show, according to the old method, the cooling of the grass below the medium surrounding it. We are forced, then, to conclude that the fundamental data of Wells' theory are inconclusive—1st, because the surfaces of the thermometers employed radiated quite as much as the blades of grass; 2d, because the thermometer destined to measure the temperature of the air was placed in an atmospheric layer much warmer than that which surrounds the grass in contact with the other thermometer.

The principle that the deposition of dew is owing to the cold caused by radiation, is, I repeat, perfectly just, but Wells' theory is incorrect. The reason of this is evidently because the influence of the air in the production of the cold which is continually developed near the surface of the earth, has been entirely neglected. It has been vaguely said, it is true, that radiating bodies, placed at a certain height, do not lower in temperature so much as those placed close to the ground, in consequence of descending currents which are formed around the first, and are absent from the second. But that was insufficient to show the true part played by the air in the formation of dew.

It was necessary to prove, as I think I was the first to do, that notwithstanding its inability to cool by radiation, the air close to the earth contributes powerfully to lower the temperature of the plants in it, by means of a series of actions and reactions, the causes and effects of which have, if I am not mistaken, been clearly defined in the second of the

two letters which form the object of this discussion. Those who have clearly seen their true meaning will permit me, without doubt, to save them the annoyance of a useless repetition, and to refer the editors of the papers of which I spoke above, to a rather more attentive perusal of the numbers of the *Comptes rendus*, where they are inserted. After which they will be quite at liberty to show that I am wrong; but they will first admit, I hope, that they have misinformed their readers with respect to the consequences resulting from my work on the phenomena of dew.

ROUGH NOTES ON THE HISTORY OF BOTANY.

BY A. A. F., SYRACUSE, N. Y.

THOUGH the science of botany is one of the oldest in the world, we cannot but admit that by mankind in general it has been deplorably neglected. For centuries, a knowledge of this delightful science was confined within the walls of monasteries, so that little botanical information reached the minds of the populace. In the earlier ages there were botanical devotees—"herbalites," as they called themselves, who devoted themselves to the study of plants; but the advancement which they made was liable to be lost and forgotten in the dim light of the dark ages. All concentrated their efforts to one point, namely, the *classification* of plants, which seemed to baffle all their investigations, and set at naught their united researches.

The oldest mention of the subject of plants which we have, may be found in the History of the Creation of the World, by MOSES. It was on the third day of this great work that GOD said, "Let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind, whose seed is in itself upon the earth, and it was so, and the earth brought forth grass, and the herb yielding seed after his kind, and the tree yielding fruit, whose seed was in itself after his kind, and GOD saw that it was good." It is recorded that ADAM gave names to all the beasts of the field and to all the fowls of the air, and to everything wherein was life. But MILTON imagines that to EVE was assigned the pleasant task of naming all the flowers, and numbering their tribes. When our parents were cast out of Paradise for their disobedience, and were about to depart from their delightful home, EVE, in the bitter anguish of her soul exclaims—

> O, unexpected stroke, worse than death!
> Must I leave thee, Paradise? Thus leave
> Thee, native soil, these happy walks and shades,
> Fit haunts for Gods, where I had hoped to spend,
> Quiet though sad, the respite of that day,
> That must be mortal to us both. O flowers,
> That never will in other climate grow,
> My early visitation, and my last
> At even, which I bred up with tender hand
> From the first opening bud, and gave ye names,
> Who now shall rear ye to the sun, and rank
> Your tribes?

The Bible and the poems of HOMER, afford us the only vestiges of the botanical knowledge in the earlier stages of the world. Among the most renowned of early botanists were ARISTOTLE, who published various works upon Natural History about 386 years before CHRIST. THEOPHRASTUS published a work entitled "The Causes of Vegetation," also "A History of Plants." He treated upon the different kinds of plants separately,

such as aquatics, parasites, culinary herbs, &c.; he also treated upon their anatomy without the aid of a microscope, and advanced correct ideas respecting the various functions of their structure. DIOSCORIDES was a physician of *Greek* extraction who traveled over *Greece*, Asia Minor and *Italy*, in order to obtain the plants of those countries. He divided them into *four* classes, and gave descriptions of over 600; his labors were of comparatively little value, on account of want of method and arrangement. PLINY, who lived in the time of NERO, protested against the erroneousness of the times, and also published some valuable works; his "History of the World," was evidently intended to embrace the whole of nature. Many learned men devoted their untiring attention to botanical study; a detail of all would carry us beyond our limits. Among the most popular of later times were LEONARD FUCHS, of Germany, and TOBBIN, physician to James 1st. GESNER was also a native of Germany, of humble and obscure origin; he possessed a powerful and penetrating mind, and exploring the *Alps* he discovered many valuable plants which were then unknown. He conceived the idea of groups, or natural affinities in plants. His descriptions were reliable and accurate; before his time the art of describing plants with accuracy, was unknown. CLUSIUS was born about the year 1526; his parents had destined him for the profession of the law—but his decided love for the study of nature finally induced him to abandon his profession. He traveled over most of Europe, and made more discoveries in the vegetable kingdom than any other botanist of his day. CESALPINUS, who lived cotemporary with CLUSIUS, proposed to arrange all known species into classes, but his method was too imperfect to make it in any way valuable. JOHN BANHIN, the friend of GESNER, composed a "General History of Plants," which was a work evincing great learning. GASPARD, his brother, conceived the plan of a work which should embrace accurate descriptions of all the plants which former botanists had discovered. About this time the plants of our own country began to attract attention. LOUIS XIV sent to America a botanist by the name of PLUMIER, who made many valuable discoveries. He described more American plants than any other traveler had done. Botanists now began to study the stamens and pistils of plants, as it was predicted that the science would remain obscure as long as *species* and *genera* remained undefined; the result of which was the production of a work by *Ray*, a celebrated botanist, entitled a "General History of Plants," in which he separated them into thirty-three classes, twenty-seven of which were composed of *herbs*, and the rest of *trees*. JOSEPH PITTON DE TOUNEFORT, was born about the year 1656. He had also been destined for a profession, but he, while young, also evinced a great fondness for the study of nature, and finally devoted himself exclusively to it. He traveled over the Alps and Pyrenees collecting many new flowering treasures. It will be observed, that up to this time the endeavors of botanists were mainly directed to the discovery of some mode of classification. Investigating minds now began to study their anatomy and physiology, which had been totally neglected since the days of the *Greek naturalists*. It was at this period that the microscope was invented, which threw much additional light upon the subject. As yet, however, the science of botany lay in scattered fragments of various contending systems. Much labor had been bestowed, and many facts collected, but there was no central point around which their information could be gathered. CHARLES VON LINNÆUS was undoubtedly the greatest botanist in the world, for it was through his system that all others have originated. He was born in the year 1707. His father was a clergyman, and had designed his son for the same sacred office, but seeing him leave his books and ramble in the fields in search of flowers, he inferred that he was a weak mind, unfit for close investigation, and was about to put him to some mechanical employment, when some discerning persons, perceiving his

devotion to the study of nature, placed him in a situation favorable to the development of his peculiar talent. LINNÆUS formed anew the science of botany—he defined every plant with precision, and gave it an appropriate name. He studied the stamens and pistils, believing, as he did, that no plant could be destitute of them; the result of his investigations was the production of his beautiful arrangement called the "Artifical Method."

Among the first of moderners who investigated the internal structure of plants, were GREER, LEUENHOEK, and CAMERARIUS.

Messrs. LINDLEY and LOUDON, of England, have published many valuable works, and given an increased impulse to the advancement of our educed science. Drs. TORREY and GRAY, of our own country, have done much in perfecting our present system of botany. Dr. GRAY'S Manual of Botany is the best in use in America; his Botanical Text Book is the clearest exposition of vegetable physiology that I have ever seen, and is, I believe, the American standard. There are many other celebrated botanists of our age, who have done much to increase taste for our science, and to remove the obstacles which have so long debarred us from obtaining a knowledge of the noblest of nature's works. Botany rests now on a solid foundation, and no other science can boast of more firm and true advocates than it; and it is hoped that as discoveries are made, they will cluster around the principiples already established, each taking its proper place in the various departments now arranged for the reception of scientific truths. AUGUSTUS A. FAHNESTOCK.

A COTTAGE FOR A COUNTRY CLERGYMAN.

[SEE FRONTISPIECE.]

WE noticed with delight in Great Britain, that among the warmest devotees of horticulture and rural taste generally, are the country clergymen. Their homes are always pictures of comfort, snugness, and beauty, and thus exercise a more powerful influence in disseminating a love of rural life and domestic enjoyment among the agricultural population than the castles and mansions of the great proprietors.

Little by little, something of the same tastes are growing up in this country. We received a letter lately from a clergyman in Worcester county, Mass., (whose name he would prefer withheld,) soliciting some assistance in the plan of his house. His letter contained a sketch of what he considered the essential features of the plan, and as we have always found that a home is most conveniently arranged when the architect proceeds upon the ascertained and acknowledged wants of the family, or the class of families for whose use it is intended, we have in modifying and re-arranging the cottage for our friend, the country clergyman in Massachusetts, adhered pretty closely to his own sketch of the principal floor—only varying it where it could be improved.

As his letter will explain his wants and those of many who are situated like him, we print the following extract from it, for the benefit of our readers, in order that they may see the real requirements of such a family.

A. J. DOWNING, Esq.—In the "*Horticulturist*," to which I have become a subscriber, I find a few pages devoted to answering the questions and relieving the difficulties of your correspondents. Following their example, will you allow me to detain you a moment with a statement of my troubles, with the hope that you may give me a little assistance—not, at present, in respect to *plants*—but *houses*.

I recently purchased, and have read with much interest, your volume upon "*Cottage*

Residences." I have been wishing to procure a *home*—one however, plain and simple in its character, that might yet have something attractive about it, above the appearance of the unsightly fabrics that are too often classed under the head of houses. And I turned over the pages of your volume in eager hope of finding something that would be adapted to my wants, and that would be so economical in its construction, that it might be made available for the comfort and convenience of a *poor country clergyman*, in the condition of him who addresses you. There were many of those *snug cottages* that charmed me, but I could not find in them what I cannot do without—*a study*. It was only in the more expensive structures, the cost of which places them wholly beyond my hope of possession, that the "*library*" found a place. With the expectation that others will aid me in the erection of a house, from absolute necessity, I wish to restrict myself to the least possible outlay. Yet I have felt that the most modest residence might have something of true beauty in its character, and that there was no need in any structure, of sinning against architectural propriety and law. I dare not think of having a house that shall cost much above $1,100 or $1,200, for I can ill afford to pay the rent of one that shall much exceed that cost? But is it impossible that for about that sum we may be furnished with the conveniences we need? We have in prospect of possession, a little bit of land, but half an acre, fronting to the *south* upon the road, which runs east and west. To the west and south-west we shall have a fine prospect, which we wish to enjoy by bringing the rooms mostly occupied upon that side of the house. The rooms we desire upon the first floor are a kitchen, sitting-room, bed-room, study, parlor, and pantries, etc. We wish to place the house upon the east side of the lot, or very near the east side, that the garden may occupy the other portion. From your "Cottage Residences," with my own cogitations, I have endeavored to approximate such a plan as we need,—yet find it still defective; and I much desire to know whether it will meet your sincere approval, or if you can aid me in regard to the defective points. Will you have patience with me, while I lay before you a rough sketch of my plan—and tell you what there is to *me*, unsatisfactory about it.

[We omit the country clergyman's sketch of plan, which we have varied and improved, though the main features of his sketch are all retained, and his remarks upon it.]

And now what should be the external finish of such a house, that it may be neat and proper, yet without any *showing pretension*? I have attempted to give you a *front elevation* with my *pen*, but it has run wild with me. I will try my pencil, and may succeed better.

My difficulties are to bring the kitchen nearer the sitting-room, without giving up the bed-room; to get a back stair-way, underneath which may be a way to the cellar; and to obtain a room over the kitchen; and to know whether the plan of such a house would meet the approval of an architect's eye, externally—or how, most economically, it may be made acceptable to correct taste in its outward appearance. Which of the styles among your "Cottage Residences," would be a proper and economical finish for this? Poor as I am, for I possess not a farthing aside from my salary of $700 per annum, I dislike to be accessory to the erection of a house that shall be an eye-sore to those who may rightly judge it. We have few houses here built with any regard to good taste. I appreciate most fully all that you say about the proper construction of houses, and now, when I am struggling to obtain one for my own home, I desire that it may be, however humble, an approximation to what a neat little "parsonage" should be—and that it may be a *standing lesson* to those who belong to my parish, of the manner in which a pleasant, unpretending home may be constructed—with the hope that it may not be without a certain tendency in its influence upon their minds, to an increased refinement and moral elevation.

I beg pardon for so long taxing your patience. I should not have been emboldened to address you thus familiarly, were it not for the *con amore* spirit with which you have written upon the subject of architecture, and of *homes*. If you will be kind enough to give me a little help in respect to the points that perplex me—or if you will furnish for the "Horticulturist" the design for a *cottage* for a *country clergyman*, that shall include the accommodations which I have suggested on the first floor, with three or four lodging rooms in the chambers—and at a cost that shall be within the means of *us poor ministers*—you will greatly oblige me and others, and help those who *would* do something to carry out the principles which you have so ably advocated. Yours very respectfully.

For the plan and perspective view of the cottage which we have designed for the "parsonage" of the author of the foregoing letter, we refer our readers to the Frontispiece of this number. In the elevation we have chosen a simple cottage style—one that always befits rural scenery, and gives the most room for the cost of any style that can be adopted. The rustic veranda, and rustic trellises over the windows, are intended for vines—but not merely as a support for vines—but rather as thereby giving an air of rural refinement and poetry to the house without expense. We say without expense; and by this we mean comparatively; for we do not mean these rustic trellises to be built by carpenters, and included in the original cost of the cottage, but to be added afterwards from time to time by the clergyman himself, aided by some farm-hand, expert with the saw and hammer. They should be constructed of cedar poles—with the bark on—which may be had almost anywhere in Massachusetts for a trifle, and which if neatly put together will be more becoming to such a cottage as this than elaborate carpentry work. By the addition of such trellis work and a few vines, a simple rural cottage like this may be made a most attractive object in a rural landscape.

The plan (see frontispiece,) is, as we have said, mainly that of our correspondent—the country clergyman. We have only retouched it here and there, so as to bring the rooms into good fellowship. We could not afford a separate "back-stairs," but we have given something of the utility of one, so far as the cellar way is concerned, by shutting off the back entry from the front hall, by a door at C. A door at D, opens on the veranda. There is a study with places for books, at B, (where otherwise may be a door to connect the study with the living room, if thought desirable:) a nice parlor on one side of the entry, and a living-room on the other side—which living-room has two convenient closets so placed at the side of the room as to form a kind of bay-window effect, that would be pleasing and convenient. There are also, a kitchen, a bed-room for the family, and a childs' bed room, all in connection. The door between the latter and the back entry should be glazed, to admit light to that part of the entry behind C. If a communication between the entry and the large bed-room is thought more desirable than the closets, a door placed there instead of the closets. would answer that purpose.

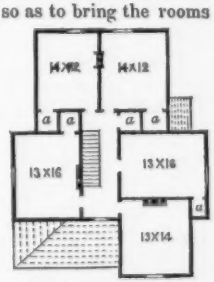

Fig. 1—Second Floor.

The second floor plan, (fig. 1,) shows five good bed-rooms with a closet to each, (drawn to a smaller scale.) Fig 2 is a slight sketch of the rear of the house—

Fig. 2—Sketch of the Rear.

showing the back porch and the arrangement of the kitchen wing. To build this house for the sum named by our correspondent, it must, of course be constructed of wood, and in portions of of the country where both labor and materials are not at the present high prices about New-York. The whole must be constructed in a simple manner—the inside walls to be white-washed or neatly papered—the first story to be 9½ or 10 feet high only.

The principal merit of this design is in its comprising a convenient arrangement for the purpose, brought into a form that is rural and picturesque.

CONDITIONS REQUIRED FOR THE GROWTH OF PARASITIC FUNGI.

BY J. TOWNLEY, MOUNDVILLE, MARQUETTE CO., WISCONSIN.

In this age of inquiry and progress, it is surprising that so little attention has been paid to the habits of parasitic fungi, and that so little is really known respecting the conditions which favor their growth and increase. To the farmer and gardener the subject is one of much importance; not a season passes without much of their labor being rendered of no avail by the influence of these almost invisible destroyers. How great, for instance, is the loss annually sustained by the attack of rust, smut, and mildew, on the wheat crop alone? and who can estimate the value of the food destroyed within the last five years, by the attack of the parasitic fungus Botrytis infestans on the potato? Almost every plant we cultivate is liable to be atacked by fungi, and he would certainly be entitled to no mean place among the benefactors of mankind, who should discover a means by which their development might with certainty, and at will, be prevented. The powers of man may not be permitted to extend thus far, nevertheless, there are grounds for concluding that by patient inquiry, and well-considered experiments carefully conducted, we may ultimately attain greater control over them than we now possess.

Different plants, as well as different animals, have their peculiar parasites, some parasitical fungi will indeed prey upon many different plants, but the attack of a species is generally confined to a certain natural order of plants, or to a genus, or to two or three species of a genus; whilst some, as in animals, seem to exist on a particular part only of one species. The parasitical fungus which is the cause of the mildew of wheat, will not live upon turneps; that which infests the turnep will seize upon the cabbage, they being nearly allied plants, but it has no power over the potato; yet the parasites of the turnep and the potato are nearly allied. For a plant to be attacked by fungi, two things, then, are required; the presence of the reproductive germs of its peculiar parasite, and the conditions required for their growth. Hence, one apparent means of securing a crop against an attack of fungi, is to obtain seeds of plants free from their parasite, and to grow them on land where no similar crop has been previously, or at least recently grown; a second mode is to destroy the germs, if seeds or plants are known to be infected, as is commonly done in the case of wheat. It has been proved experimentally, that wheat may be inoculated with smut, by simply mixing smutty ears with clear grain previous to sowing. And "Quekett found that he could propagate the ergot of rye by mixing the sporules with water, and applying this to the roots." (Balfour.) These facts, coupled with the beneficial effects of steeping grain in various solutions, indicate that the germs of fungi find their way into plants by means of the root, or through the seed itself. May it not be worth while trying whether any benefit would be derived by steeping seeds of the pear in weak alkaline solutions, as of lime, potash, or ammonia, which are said to form a soapy matter

with oil in germs of fungi, and thus destroy them. In old nurseries, having a tenacious soil, and where healthy pear seedlings cannot now be raised, it may be well to try the effect of paring and burning the surface soil where the pear seeds are intended to be sown. If the burning is so managed as only to char the organic matter, the soil might be freed from the germs of fungi, and its productive powers at the same time increased.

It is doubtful, however, whether these precautions will in all cases insure the safety of a crop. The spores of fungi are probably admitted into the interior of plants, by the stomata or breathing pores of the leaves, as well as by the roots. Leaves inhale gases and absorb moisture; and how very minute must be the reproductive germs of a plant, when the plant itself, in many Instances, is so small as only to be seen distinctly by the aid of the highest powers of the microscope. If they are admitted into plants by this means, then it is an important question to determine what are the conditions required for their development, and whether any of them are under our control, and by what means they can be avoided. We shall have the surest ground for hoping successfully to subdue this evil, if we can only discover the secret of its power. I think it may be assumed that fungi have not the power to destroy healthy vegetation—if they had, where would be the limit of their ravages? The Rev'd. M. J. Berkeley, who is highly distinguished for his knowledge of fungi, has observed young plants of Botrytis infestans springing from within the cells of a potato. As the potato tuber is considered to be formed exclusively of matter which has been prepared by mature leaves, these germs could not have immediately vegetated on entering the potato plant, but were probably carried with the elaborated sap of the leaves, and deposited with it in the tissue of the tuber. Mr. Berkely has further stated that "it seemed to him most certain, from observation of those fungi which grow from the tissues of plants, that minute particles, too small to be distinguished by the highest powers of the microscope, must be carried about with the juices, and when fitting circumstances concur, proceed to act on the tissue with which they are in contact." What then are these fitting circumstances? The two tribes into which fungi may be artificially divided, have separate tasks assigned to them. The office of one is obviously to hasten the decay of matter which is already decaying; the office of the other, I believe, is to prey upon or hasten the death of that which is unhealthy. Those which flourish on dead organic matter, appear only when decay has commenced, not while it is yet fresh—a fact well known to many. "Fungi," says Mr. Solly, "are only developed in those solutions which are in that state of putrefaction favorable to their growth; moreover, they do not appear till the solution has acquired that state." There must, I believe, be unhealthy action, possibly some slight chemical change in the fluids of superior plants, before parasitic fungi can successfully attack and destroy them. Mr. Berkeley, however, whose opinion is entitled to much deference, considers that the growth, and especially the numbers of fungi, depend upon certain atmospheric influences. There can be no doubt, whatever, that the state of the weather has considerable influence on the development and increase of fungi in ordinary cases. For instance, in moist, dull seasons, crops are observed to be always more or less affected by mildew. Any sudden check in the progress of vegetation, such as is caused when hot sunny weather is succeeded by calm dull days, or by a sudden transition from weather favorable to rapid growth, to weather cold and wet, is generally considered the precursor of blight, and favorable to the growth of fungi. Now, circumstances like these would exercise an injurious influence on the health of the larger plants; it is therefore doubtful, whether it is not the state of the plant attacked, rather than any peculiar atmospheric condition which favors the growth of the parasite.

Other facts seem to indicate very clearly that circumstances of soil, situation, manure,

&c., predispose plants to an attack of fungi, independent of atmospheric influence; thus we read respecting the diseases of wheat—"it rarely happens that blight, rust, and mildew are felt in sunny seasons, except in confined enclosures, or marshy ground, where the evening dews stagnate, and fogs are generated." Again, "in looking over a blighted field of wheat, we may observe that the lowest and richest parts, or where it stands thick upon the ground, are more affected than those which stand higher." Wheat to which manure is directly applied, is found more subject to rust and mildew, than that which is grown upon a clean fallow. An interesting instance of the predisposing influence of an excess of manure, is mentioned in the Agricultural Gazette. Wheat which had been top-dressed with guano, "was a good crop, and free from symptoms of blight, excepting in the spots where the sacks were put down; here the straw was blighted, evidently from receiving an overdose." Now, all these different circumstances would tend to make wheat plants unhealthy, hence the attack of fungi—it cannot be attributed to atmospheric influences in these cases; since wheat growing in large open fields, or on the higher parts of fields, or on clean fallows, instead of on land recently manured, or if plants growing at proper distances apart, escaped. The atmospheric conditions under which the healthy and blighted plants were growing, must have been the same in most of these instances, but other conditions which affected the health of the plants, were not the same; the inference therefore, is, that the latter are most likely to be the conditions which led to the attack of fungi.

Andrew Knight considered that one of the principal causes of mildew was the want of sufficient moisture in the soil, more especially if excessive humidity in the air, and low temperature succeeded warm bright weather. The pea when cultivated late in the fall is very liable to be attacked by mildew, and Mr. Knight found that by deepening the soil and by copious watering he could prevent its appearance. In a forcing house he found it equally easy of appropiate management to introduce or prevent the appearance of mildew. "When he had kept the mould very dry, and the air in the house damp and unchanged, the plants soon became mildewed, but when the mould had been regularly and rather abundantly watered, not a vestige of the disease has appeared." The development of fungi in these cases also was obviously not dependent solely on certain atmospheric conditions, but partly on the state of plants consequent on the moisture or dryness of the soil in which they were growing.

We have further evidence that the growth of parasitic fungi does not depend exclusively on atmospheric influences. Varieties of the same species of plant growing under the same circumstances may offer greater resistance to fungi than others, owing apparently to some peculiarity of constitution, or to greater constitutional vigor, or to the stage of growth they have reached when exposed to the external influences which favored the devolopment of the parasite. When examining crops of potatoes on the first outbreak of the latest form of disease of that plant, known as the blight, or murrain, I have observed early varieties with the foliage destroyed, many of the tubers having the peculiar rotten-apple-like appearance while the parasite had only just commenced its ravages on some adjoining patches of a later variety. Instances have occurred in which tubers of a late variety had been introduced with the manure into a plot of any early variety, and the late plants continued to grow vigorously, while the foliage of the early ones was nearly destroyed and the tubers decaying. If the growth and increase of fungi depended solely upon certain atmospheric conditions, should not the attack have been simultaneous in these cases? The plants were growing under the same circumstances, living in the same soil, breathing the same atmosphere, and whether the germs of the parasite are admitted into plants by the

roots or by the leaves, it is probable that both the early and late varieties were inoculated with the germs at the same time, but in one the conditions were favorable for their development while in the other they were not favorable, and the difference must obviously have been owing to some internal cause as both were subject to the same external influences.

It has been commonly observed that varieties of the potato are usually attacked as they approach maturity, as if a certain cessation or decline of the growth of the plant favored the growth of the parasite; varieties of the potato are not however invariably mildewed at a certain stage, or when the plants have nearly perfected their tubers, neither is wheat and other grain crops always, though generally, blighted by rust or mildew when the plants are in ear. The vitality of an annual plant like wheat, or of the potato, whose stems endure but for a season, is probably more energetic at the commencement of their growth than when they have nearly performed their functions, and they may in consequence be better able to resist the action of ordinary external influences at that time than afterwards. If this be so, then it is not unlikely that different varieties of our cultivated plants growing under the same circumstances may offer greater resistance to attacks of fungi than others seeing that they possess different degrees of constitutional vigor. This is a point in the inquiry of considerable interest, whether according to the vigor or controlling power of the vital principle of a plant, so will be its power of contracting the action of ordinary external influences and its comparative freedom from disease arising from attacks of fungi.

Many of our garden plants are propagated by extension, that is by buds, cuttings, layers or roots instead of by seeds,—and notwithstanding the "tale of woe" revealed to your correspondent, Mr. Marshall, by the gallant old apple tree, which in spite of its age and infirmities persisted in believing that it retained the vigor of youth, I may be permitted to say that the evidence of apple trees and other plants seems to me to afford substantial grounds for coinciding with the views advanced by Andrew Knight, that each plant propagated by extension has a limited duration, that it cannot by any known means be continued equally healthy and vigorous forever; but that sooner or later the progeny will gradually decline in vigor become unhealthy and unproductive, not suited to the purposes of the cultivator and consequently extinct. This also suggests an interesting branch of the inquiry, whether as a variety declines in vigor it becomes more subject generally to attacks of fungi, or if an attack is more virulent and damaging than on younger and more vigorous varieties, growing under the same circumstances.

The hop is generally propagated by cuttings, and a writer who has raised plants from seed, in consequence of his old plants dying off, and the hops becoming small, and of a bad color, said, "We write from experience; having raised very many hop plants from seed, we have found them to be much more energetic and vigorous than those which have been raised from cuttings, their luxuriant growth enabling them to withstand the effect of blight." It is well known that some varieties of the potato have suffered much less from the blight than others, while some varieties recently raised from seeds, in the United States and Prussia, are said to have continued free from the disease, though growing near to others which were infected. I believe the potato plant, considered in the mass or as a species, to be in an unhealthy and degenerate condition; that it is, in fact, heredeterarily diseased, the accumulated result of maltreatment and neglect in the culture of the plant, operating through successive generations. This, I believe, is the foundation or predisposing cause of the disease; that the parasitic fungus, Botrytis infestans, is the immediate or exciting cause, the observations of men so well qualified to observe with accuracy in matters where fungi are concerned, as Berkeley and Morren, have already placed beyond the

reach of controversy, though possibly not of cavil. The unprecedented attack on the potato, so much more extensive and virulent than the usual attacks of fungi on other cultivated plants, I consider to be the result of its previously unhealthy condition. If these views are well founded, then the question, What are the conditions required for the growth and increase of parasitic fungi? has a great practical bearing, if considered with reference to this plant only, because if their growth and increase does not depend solely on atmospheric influences, but is favored by the unhealthy state of the larger plant, then we may reasonably hope, that by restoring the plant to its pristine vigor, with judicious selection, through several successive generations of seedlings, with improved culture, we shall obtain varieties which, when propagated by divisions of the tuber, will, for a time at least, resist the attacks of their parasite, just as wheat, turneps and other crops annually raised from seeds, now do; further than this we are not justified in anticipating. What we know of the attacks of fungi on other crops, forbids the hope now that the parasite of the potato is established in this country, (for several facts seem to indicate that it is a recent introduction to North America and Europe,) that our crops will ever be entirely free from mildew when the potato is restored to the highest rate of health which it is capable of attaining. And it is equally vain to expect, as many have done, that the vigor of the plant can be restored by one generation of seedlings. The progeny of unhealthy and degenerate parents cannot reasonably be expected to be perfectly healthy and hardy. The result of upwards of a century of mismanagement, cannot be entirely obliterated by the first step in the right direction.

The fact that pear seedlings are attacked by their parasite, may seem to many a serious objection to the conclusion I am induced to arrive at; but as plants annually raised from seeds are not exempt, I do not see why young plants of the pear should offer greater resistance, when exposed to influences which affect their health. I think it may also be questioned whether a plant whose average duration is supposed to be about 400 years, is not more susceptible of injury, or more easily affected by adverse atmospheric influences in the first few years of its existence, than when in the prime of its life. This seems to be the case with the Osage orange, at least,—but possibly this can hardly be considered a case in point, inasmuch as the difference in the power to withstand the severity of our winters, may be owing to the more concrete state in which I suspect the sap is deposited in the tissue of the wood during winter, in mature, as compared with young plants. A further question arises here, whether woody plants, when once attacked, do not afterwards become more under the control of their parasite. The first appearance of the fungus on Mr. Knight's pear trees, caused him no alarm, it being confined to spots on the leaves, but in after years the young wood also became affected, and perished.

The way in which parasitic fungi injure plants, is not, I believe, understood generally. They do not grow on the surface merely, of leaves, prevent perspiration, and thus cause death. They spring from the living tissue and destroy it. What we see of the plant externally, is merely the fructification—the plant itself, composed of minute, thread-like filaments, spawn or mycelium, as it is usually called, is concealed in the tissue. Now the contents of the cells of plants are various, as researches recently made by the aid of chemical reagents indicate; the mycelium of fungi has the power of piercing the cell walls. By thus rupturing the tissue the contents are set free, they are no longer under the control of vitality, hence chemical action ensues, putrefaction of the part attacked follows, morbid matter is thus generated, which circulates with the fluids of the plant, and gives rise to further unhealthy action.

In this matter as on so many other points, a close analogy seems to subsist between the

animal and vegetable worlds, the same law appears to prevail in both, that an unhealthy state of the larger plant as well as of the larger animal is the essential condition required for the attack and increase of parasites. "The different species of minute insects," observes Mr. Knight, "which feed upon the bodies of our domestic cattle, are scarcely ever seen, and never injurious so long as the larger animals retain their health and vigor; but when these become reduced by famine or disease, the insects multiply with enormous rapidity, and though they are at first only symptomatic of disease, they ultimately become the chief and primary cause. The reciprocal action of the larger plant and the mildew, upon each other, may be somewhat similar." (Knight's Phys. and Hort. papers, p. 208.)

I apprehend no further remarks are needed to prove that this is, as you observe, an important subject of investigation, and I would suggest in conclusion, whether some Horticultural Society, or the Pomological Congress would not do well by instituting a searching and systematic inquiry with a view to ascertain what are the causes which lead to attacks of fungi, and by what means they can be prevented or modified. It is well to reward the successful improver of the pear and other fruits as our Horticultural Societies now do; but how much greater would be the service rendered to horticulture, how much more profitably would be the money expended, if a means could be discovered which would enable us to grow in a healthy condition, those varieties we already possess, or may hereafter obtain? If the inquiry should be confined to the pear alone; the first steps to be taken would be to determine the name of the fungi. A few fresh infected leaves hermetically sealed in a light tin case might be transmitted by post to the first authority on these plants in this country, and to two or three distinguished cryptogamic botanists of Europe—say the Rev. M. J. Berkeley of England, Professor Morren of Belgium, or Dr. Montagne of France, not only with a view to ascertain the name of the parasite, but whether it exists in Europe, and if any means are there known to prevent its development or diminish it power. A plain and accurate description of the disease should then be drawn up, and distributed with a series of inquiries, in different parts of the states to individuals likely to afford useful and accurate information. The returns would show the geographical limits of the disease, the period of its development and its intensity in different parts. I append a few inquiries which have occurred to me.

1. Has this disease been observed by you in the locality where you now reside, and if so, how long has it been experienced?

2. When once developed has it ever entirely disappeared, and under what circumstances?

3. Are seedlings more liable to be attacked than grafted varieties?

4. Among grafted varieties do any uniformly offer greater resistance to the disease than others?

5. What is the character of the soil of your orchard or nursery, and if there is any difference in the quality, texture, moisture or dryness of the soil, are trees more free from disease in one part than another, and if so, which?

6. State the position of your orchard, whether on low ground or on the side of a hill, and whether you have observed in the same locality trees to be more exempt from disease in one position than another?

7. Are tecee growing in damp shady places more affected than those in more exposed situations?

8. Does difference of aspect, as the north or south side of a hill, make any difference?

9. Are trees growing in grass less affected than those in cultivated lands?

10. Have you tried trenching or deep plowing an orchard or nursery, or where pear seeds were sown, and with what results?

11. Have you mulched newly planted as well as established trees, and have these been more exempt from the disease than others in the same orchard not mulched?

12. In a locality where the disease exists, are pear seedlings always healthy if raised in new land?

13. Have you steeped pear seeds in any solution previously to sowing, and with what success?

14. Have you pared and burned the surface soil intended for the seed bed?

15. Have you dusted flour of sulphur on infested leaves or shoots, or inserted a portion in a hole in the stem, or applied a weak solution of sulphuric acid to the soil around a diseased tree and with what results?

16. Have you applied any special manure to your trees, which exercised any marked influence, beneficial or otherwise?

17. Have you observed the character of the weather immediately preceeding the development of the fungi, and whether in the same or different seasons their growth and increase seemed to be favored with peculiar atmospheric influences?

18. Have you tried any experiments with a view to cure or prevent the disease, or can you supply any additional information calculated to throw light on the subject, and which is not comprised in these queries? Respectfully, J. Townley.

Moundville. Marquette co., Wis.

THE POTATO AND BUTTONWOOD DISEASES.

Dear Sir—After all the time that has elapsed since the potato disease made its appearance, and the many speculations that have appeared, pray inform me if anything is considered as settled on the subject? Is there any well ascertained cause for this malady? That there has been no certain remedy discovered, I am well aware, nor does it appear to me there is likely to be, so long as we remain wholly in the dark as to the origin or cause of the disease.

The same remarks apply to the disease under which the buttonwood still suffers in all parts of the country; I should say, perhaps, such as are not already killed by it. It is now some ten years since this disease made its appearance. At that time the plane tree, or buttonwood, (sycamore it is often incorrectly called,) was one of our fairest and most majestic forest and shade trees in all parts of the United States. At the present time, hundreds and thousands of the trees—many of them of fifty or sixty years growth—are entirely dead, most of the remainder are either half dead, or in the last stages of decline and debility, and it is a very rare thing, indeed, to find a healthy and luxuriant specimen anywhere in the Atlantic states. The loss of the plane tree is not such a positive loss to be counted in dollars and cents, as that of the potato crop, still it is worthy of being noticed, that one of the hardiest and most luxuriant of all our native forest trees, which has evidently never suffered in this way before, (vide, the fact that sound trees were to be found 200 years old, in a sound and healthy state before this malady,) should be a marked tree, to be visited by such a plague, while all the other trees of the forest remain healthy and vigorous. Can nothing be done for the sycamore? Will you, or some of your correspondents, throw a little light on the subject. Yours, A Constant Reader.

New-York, June, 1851.

REMARKS.—We are sorry to be obliged to say, nothing satisfactory has yet been settled, regarding the nature of either of these disease or the remedy.

If our correspondent wishes us to add our speculation, to the pile of speculations already before the public, it is at his service.

We believe both the potato disease and the Sycamore malady to be not the same disease, but diseases owing their origin to causes quite similar. We think them both the result of an attack of the growing parts by peculiar fungi, the seeds of which are invisible to common eyesight, floating about in the air. Wherever these seeds of fungi light upon vegetation to which they have a natural affinity, they take root in the young vegetable tissue —propagate themselves and gradually destroy the healthy functions of the plant. In the potato, the fungus attacks the tops, but its decomposing influence is not confined there,—like mould—which is a species of fungus—its influence, so destructive to the life-tissues of the plant, penetrate to the root and appear there in the form of the *rot*. In the Sycamore, the smallest and tenderest young shoots are first attacked—the poison of the fungus thence gradually extends in a blackened filth-line down the branches, directly in connection with the young shoots, until at last the whole tree is poisoned—healthy vital action ceases, and the trunk dies. The fungus ripens its invisible seeds in these decaying plants and trees; these seeds floating in the air seize upon other healthy trees, and thus, little by little, the disease extends all over the country.

Some fifteen years ago, Buttonwood disease appeared at the South. Ten years ago it began to be fatal in Philadelphia. At that time it had not reached New-York, where the trees were still green and flourishing. It gradually spread northward, it has since reached Canada and will extend all over the continent. The only mitigation of it seems to be in severely heading back the whole top of such trees as are affected, boring a hole in the trunk, filling it with sulphur and plugging it up tightly. We have known trees so affected put out a new head and recover a healthy appearance again. But there is now little doubt that the disease will exterminate the present generation of Plane or Buttonwood trees from the United States altogether. It is a little curious that the plane tree of Europe (*Platanus orientalis*,) though so closely resembling our native buttonwood, is not liable to the disease though standing near affected trees. We have had an opportunity of observing this in our own grounds, and were told in England last year, that a long time ago this very plane tree disease appeared in England and swept off most of the *American* species (*P. occidentalis*,) while the European plane tree remained untouched. Such being the case and the growth of the oriental plane being the more ornamental of the two, no one will plant our native species for the present—but select the oriental and especially the *pyramidal* plane tree, now to be had in some of the nurseries.

The potato disease has extended gradually but rapidly in the same manner all over the world. At the present time its effects have raised the price of potatoes, as an article of food for winter use, nearly four-fold in many parts of the Union.

We notice that recommendations have lately been made of the use of powdered *sulphur* in the hills when planting. If it could be sufficiently pulverised and divided by mixing it with ashes or some such substance to render its use feasible in an economical point of view, we should think it more likely to answer the purpose than any other substance—simply because we know that sulphur is the only remedy for certain kinds of mildew and blight—the result of the attack of fungi—yet successfully applied. The chief point, therefore, the remedy being known, is to discover how to apply it with practical benefit.

And how is it that these fungi suddenly make their appearance all at once and spread all over the earth—readers will naturally ask? It is not easily answered, the most pro-

bable solution seems to be that they are the result of some electrive agency, and are deposited on the earth by its agency. The phenomena of *colored rain*, which has been observed and carefully examined by naturalists in various parts of the world, seems to us to have some relation to those mysterious and sudden eruptions of vegetable disease. In many cases recorded in the Journal of Science, this rain has fallen when the sky was unclouded—showing its direct dependance upon electric phenomena. In 1845 a shower of inky black rain fell in a district in England, and was believed there to be the origin of the potato disease. Prof. BAILEY, of West Point, one of our closest microscopic naturalists, has recorded two instances of colored rain which have fallen in this country, in Silliman's Journal. His analysis of this rain showed it to be composed mainly of the pollen of Pine trees—but an analysis of some colored rain which fell in England, in 1849, showed distinctly the spores of fungi. The whole subject is still far from being understood, but it is one which is taking a shape so serious to the cultivation of the soil, that men of science should bestow more attention upon it

NOTICES OF NEW PLANTS.

HABROTHAMNUS ELEGANS.—We must commend this showy and beautiful summer blooming plant, to the attention of our floricultural readers. It is a native of Mexico,

and though as yet only kept in green-houses in winter, it is likely to prove hardy at the root if covered with a foot or two of leaves and litter at the approach of winter. Young plants a foot or two high, turned out into a rich deep border, will grow three or four feet high during the summer, and bloom continual from July to November. The plant is of

luxuriant growth, and the ends of all the young shoots are loaded with clusters of trumpet or tuber-shaped blossoms, of the finest lake or dark carmine color. Altogether, it may be looked upon as a decided acquisition.

This species of Habrothamnus has only lately been introduced into this country, but it is easily propagated from cuttings, like all the *cestracea*—to which natural family it belongs. Young plants in pots, may be had of Messrs. BUIST, of Philadelphia, and Messrs. HOGG or THORBURN, of New-York.

MACLEANIA CORDATA.—A fine, green-house, evergreen shrub, growing three to four feet high, bearing opposite, oblong, lanceolated leaves, nearly three inches long, upon smooth upright branches. The flowers are bright red corolla tubes an inch long, with an open mouth of five segments of a yellow color. They are borne at the axils of the terminal roots, and contrasting with the rich evergreen foliage, have a fine effect. This plant belongs to the natural order Vacciniacæ, is a native of Chili, and flowers in summer.

LUCIA ROSEA GERANIUM.—This pretty variety of the dwarf scarlet geranium, bearing flowers of a fine *pink* color, has been propagated and disseminated considerably by our leading florists this spring. A bed of it in our own garden has been full of bloom for a month past, and appears to be a valuable budding plant for the parterre. It blooms more freely and abundantly here than in England—where it was originated—probably from the greater abundance of sunshine which both this and the Tom Thumb scarlet, like. It is very easily propagated by cuttings, like the scarlet varieties.

BERBERIS JAPONICA.—We believe this fine new shrub—the Japanese Berberry, brought from China to England in 1849, by Mr. FORTUNE, has only just been introduced into the United States, and is not yet offered for sale by any of our nurserymen. It is a superb evergreen, with large Mahonic-like pinerated foliage—each leaf more than a foot long. This foliage is of thick leathery texture, and is armed with lateral spines. As it was found 150 miles north of Shanghae, it will undoubtedly prove perfectly hardy here. We believe the flowers are large and yellow, but they have not yet been produced, either in this country or in Europe.

CEANOTHUS PAPILLOSUS, and C. DENTATUS.—Two beautiful little shrubs of the same general habit as the Jersey Tea, (*C. americanus*,) common in our woods, but with globular clusters and panicles of lovely azure blue blossoms, borne profusely all summer, and very ornamental whether grown in pots, in the conservatory, or in the open border. These plants, natives of California, are quite rare and new, having been introduced into England by the collector of the London Horticultural Society, Mr. HARTWIG. They have stood the winter in England, and will probably do so here. Rich turfy loam, leaf mold, and silver sand, makes the soil they prefer.

PETUNIA—*Eclipse*.—This, the prettiest of all the new varieties of this popular border flower, we saw in England last year, has been propagated and sold extensively by THORBURN, of New-York, this season. The flowers are light rose, striped with rich purplish crimson, in the same style as Hebe, but much clearer and richer in the coloring. The form is good—not rag-like and coarse, like some of the new sorts lately sent out.

Petunias and Verbenas are the most valuable plants in American flower gardens, since they defy the sun—or rather luxuriate and bloom all the more freely in it. Among the best new verbenas of the season are Heroine—a handsome lilac blue—the tresses large and abundantly produced—and St. Marguerite, (a French variety received last year,) with shaded crimson flowers produced in abundance. A dozen new sorts promise well, but we need farther experience of their merits, to speak decidedly of them.

SUCCESSFUL EXPERIMENTS IN MULCHING.

BY W. R. COPPOCK, BUFFALO, N. Y.

DEAR SIR—All facts tending to the improvement of practical results in the processes of gardening, are what are sought for by the readers of the *Horticulturist*, &c. And although much creeps into our magazines that is desultory, and of accidental origin, oftimes misleading the anxious inquirer, to the neglect of sound practical and philosophical operations, yet it is to them reference must be had, if we would keep up with the spirit of the age, and reap the advantages that are daily being developed in this subject.

Heretofore, we have been but copyists—of great schools we admit—but whose chief greatness lay in the adaptation of their genius to the peculiarities of the climate they originated in. Their processes in the acclimation of plants—the art of propagating,—systems of pruning, and the routine of tree and vegetable culture, has attained the acme of perfection, which we, having reference only to the details, have closely followed; any innovation from those standard authorities being looked upon as doubtful, if not altogether futile in purpose.

That the spirit of horticulture has received an impetus with its kindred sciences, needs no demonstration here. The nation is alive to the subject, and throughout our land the features of embellished nature are beginning to attract the eye of the traveler, and delight the lover of rural refinement.

The peculiarities of climate, superinduce specific methods, whether in reference to animate or inanimate things. Thus we find animals of a colder or higher country, cannot be safely treated in their accustomed method, when transferred to a hotter country, or to lower grounds.

The same facts apply to plants under similar removal. Even on the same isothermal line do we find prominent deviations. The quality of *constitution* is inherent in all organised beings; and in no wise is that feature of life less marked in the vegetable than in the animal kingdom. Hence the treatment of hybrid and cross-bred varieties of plants, cannot be successfully attained in these varied localities, without modified adaptedness to constitution and habit. Herein, then, lies the great study of horticulture. The analytical structure of soils for specific purposes—the altitude, aspect and position, for one class —dryness or moisture for another—the nature and effect of special manures, in ameliorating what are termed worn out soils—the peculiar effects of climate and hybridization upon vitality and longevity—specific analysis of the various trees composing che circle of hardy fruit culture—and last, though not least, a strict inquiry into the habits of all those insects depredatory upon fruits and trees.

My design in this paper is not to inflict upon you an elaborate essay upon these subjects, but to simply make known the results of some few practical results on the subject of *mulching* trees—a practice which I believe will be found indispensably necessary to the successful growth of many plants, and especially those of large fleshed varieties; such plants are usually loose in their tissues, making growth rapidly during the rainy season. This season of luxuriant growth, followed by our hot and dry summers, subject fruit culture to serious ills, such as scalding, or spongy and blighted wood, as in the apple and pear, and to drying and then bursting of the bark, as in the cherry, plum, and peach, causing the exudation of gums, and its attendant diseases. Such trees, and especially those recently transplanted, are highly benefitted by checking the too rapid transpiration through the bark, by a loose bandage of straw or *hay ropes*. The latter can be readily made in any

desirable length or thickness, by hitching the first loop to the axle of a grindstone or other crank, and feeding as in making common rope. And inch and a half for large, and an inch in thickness for small trees, are the sizes I find most suitable. They are put on the trees by beginning with a half-hitch at the bottom and winding upward, merely tight enough to hold their position. These ropes, by shading the bark from a scorching sun—keep the sap cool and healthful, without depriving it of the necessary circulation of air. Of a row of standard pear trees planted in the early spring, those thus treated are at this time full three weeks in advance of others not rope-wound. Of cherries, the rope-wound trees are fresher and fuller of foliage, with fruit in abundance now swelling, while those not wound have made but little growth, and have not set a fruit. The same difference is observable on the plum and peach. I am thus far, fully persuaded of its salutary influence, and that it will effectually check the bursting of the bark, and the guming of stone fruits, from which they rarely long survive. This experiment has been successively made for many seasons, the present embracing more than a hundred trees. I would add, also, the roots of all are mulched with spent tan, to a circumference at least equal with the top.

Mulching Trees.—It is surprising to witness the difference between the growth of trees, and especially the dwarf pear trees, from the effects of mulching the roots. Such trees I have found to have made masses of fibrous roots in a single season, nearly if not quite double to others similarly situated in every respect, but without the mulching.

So long as our tree propagators will determine to grow their trees for market, with long and bare stems five to seven feet high, before heading them in while in the nursery rows, it may be a settled axiom, that such trees will not do without strawing and mulching. Every season proves this in the loss of multitudes of beautiful and apparently thrifty bearing trees, especially among the cherry and peach. A neighboring friend whose cherries have long been the admiration of all observers, from their fine fruit and luxuriant habit, is fast losing his stock from this cause. The bursting and exudation of the gum poisoning the surrounding parts—stopping the pores of the bark below, and forming a mass of flint like substance, which gradually increases until the cellular tissues are entirely blocked up, when the tree dies.

That this malady is produced by the action of the sun, and other external causes, upon the long and naked trunk, there can be no doubt. The outer bark hardens to such an extent, that its expansion, does not keep pace with the growing tissues beneath—a vent for the over accumulating sap is a necessary result. Strawing or shading the stem will remedy this, as the outer bark is then kept in the same progress of growth as are the inner. The barbarous custom of slitting, will oft times produce relief—but when cut too deep produces the same disease.

Mulching Strawberries.—In a former number of the Horticulturist I detailed some experiments on the virtues of spent tan, as tested by many years experience. Those remarks having elicited many inquiries from strawberry growers, allow me to add, yet another valuable feature in its use, viz: earliness in fruiting without forcing.

There is not by the concurrent testimony of many individuals comprising the Buffalo Horticultural Society, a strawberry within their grounds (June 4th) more than a third grown, and generally yet merely blossoming—while from my mulched beds of the varieties, Early Scarlet, Hovey's Seedling, Burr's Seedling and Necked Pine, we have gathered *ripe* fruit from the first of June. The whole crop is ripening and coloring well, and is at least two weeks in advance of those in ordinary culture. The plants show great vigor in foliage and fruit. On stools, which were runners planted in May last year, an hundred and twenty berries were counted on many of them. Here then is a valuable fruit easily

obtained, no other means or protection being needful save a deep and rich soil (clay loam) with an inch and half covering of spent tan direct from the vat.

When strawberries are thus mulched with tan, it is easy to see that the winter frosts penetrate far less deeply into the ground—the roots are not torn or otherwise injured by the upheaval of frosty weather; the warm rays of the sun penetrate to the roots during March and April; while the soil collects and retains its heat greatly by the aid of the mulch, and the warmth arising from the increased temperature of the tan, hastens the swelling and ripening of the fruit. Your obt. W. R. Coppock.

Black Rock, June 6, 1851.

[We can add our testimony to Mr. Coppock's, as to the value of mulching trees generally, and of tan mulching in particular, as admirably adapted to the strawberry. We covered some strawberry beds last autumn about two inches deep with tan, and found them this spring in the finest possible condition—far better than beds covered with straw, litter, or leaves. The tan seems specifically adapted as a constant covering for the strawberry beds, the fruit and the foliage both being decidedly improved by it—though we have not found in our own experiments much gain in the earliness of ripening. Ed.]

PROPAGATION OF ROSES BY CUTTINGS.*

BY R. P. DRUMMOND.

It is generally believed by amateurs and others, that Moss, Provins, French, Damask, and Bourbon Roses, &c., are difficult to increase by cuttings; but by the following method, these sorts may be raised in abundance. Let a bed of well-fermented stable litter and leaves be made by the side of a north wall, and place a one or two-light frame on it so as to face the north. In this put about eight inches of leaf-mould that has been previously well soaked with water; then spread over all about three inches of sharp pit sand, and make the whole firm and level. The back part of a span-roofed pit, running east and west, with a wall in the centre, is also a suitable place for the purpose. It should be filled to within a few inches of the glass with the same kind of material. In selecting the cuttings, tolerably weak wood of the present year's growth should be taken, if it is sufficiently ripened at the base or has made one full-formed leaf. Strip the cuttings with the finger and thumb, and smooth the base, reserving the detached portion of the parent bark; cut them close above the first leaf, and insert them in the sand, but not so thick as that their leaves will overlap one another. When this is finished, the bed should be watered, to settle the soil about them, and they should have plenty of air for the first four days; but it ought to be lessened by degrees, so as to gradually inure them to a confined atmosphere. As the preservation of their leaves in a healthy state is essential to success, the bed may be formed, and the cuttings put in on the same day, without waiting until the material becomes heated, as a thin covering of cellular tissue should be formed over the wounded end of the cutting before that takes place. In the third week the greater part will be rooted, and in the fourth they should be potted off into 60-sized pots, in a soil composed of leaf-mould and loam. They should be afterwards removed into a damp frame or pit, without any water being given to their roots; but they may be slightly syringed over their leaves, and when they become well rooted in the new soil, they may be hardened off and either shifted into larger sized pots or planted out in a sheltered border, where

* From the Gardeners' Chronicle.

they will make fine plants for next year. By again levelling the surface of the beds, and making the cuttings to two eyes—always preserving one leaf, Tea-scented China, Noisette and Boursault Roses, &c., will root freely in it without any further preparation; but if a considerable quantity of the first named sorts are required, either the old beds should be taken down, and a little fresh fermented dung added, or a new one should be made, using the same sort of materials as are recommended above. The young wood should be taken before the blooms are expanded, and the cuttings prepared similar to what I have already described. The young shoots of what is called the second growth, may also be used for cuttings; they should be taken when two full-formed leaves are made, smoothed at the base, and cut down to the first leaf, then planted in a bed of the same construction as above. When they are rooted, they may be hardened off and allowed to remain in the bed until spring. Plenty of air in favorable weather should be admitted. In this way they will occupy less room than when placed in pots, and they will stand the winter better. Cuttings of Roses, like those of many other hard-wooded plants, are more certain of rooting when they are made short, especially if a healthy leaf is attached to them and kept there until they are rooted. This, however, can never be accomplished if the soil in which they are placed is subjected to the alternate action of wet and drouth; but by placing wet leaf-mould between the dung and sand, an uninterrupted supply of moisture is obtained, and no water is required from the time the cuttings are put in till they are rooted in the pots. So suitable is this treatment, that when the bud at the axil of the leaf has been damaged, or otherwise abortive, those at the root are excited, and suckers are produced. All kinds of Roses will root freely under this treatment.

R. P. Drummond.

Review.

The Fruit Garden; by P. Barry, *of the Mount-Hope Nurseries, Rochester, N. Y.* One vol. 8vo., 398 pages. (*Charles Scribner*, New-York.)

Since the issue of the first edition of our work on Fruit Trees, in 1845, *twelve editions* of that work have been published and disseminated in every part of this country, and in some parts of Europe—and the sale continues unabated to this day. Since that time various smaller works have been issued from the press, and have also met with an extensive sale. The present volume, by Mr. Barry, the well-known Rochester nurseryman, has the last and freshest contributions to the subject, and is, we think, the best of the smaller works. It does not profess to be a comprehensive work on Pomology, to which the reader is to look for complete descriptions of Fruits, since it only offers brief abridged descriptions of select varieties. It takes, however, a different and distinct ground from the other works, namely, to teach "the art of planting fifty trees on an acre of ground, and bringing them into a fruitful state in four or five years." In other words, it is written to be the hand-book of amateurs who wish to cultivate with care and skill, a few fruit trees, in a fruit garden, rather than orchard cultivators, whose operations are pursued on a wider scale, and with less labor bestowed on the detail of their operations.

The book is written in a clear, straight-forward, common-sense style, and bears the marks everywhere, of the practical cultivator who understands his subject. Of course, a large part of it is occupied with brief accounts of the modes of propagation, budding, grafting, layering, &c., in which, of course, we find little or nothing that is new to those

in possession of works already published—but the author explains these operations afresh, in a concise, graphic, and agreeable manner.

The point in which Mr. BARRY'S work mainly differs from other works published in this country, and in which it is a decided improvement upon them, is one that we naturally expected, both from its title, and its later date. We mean, of course, PRUNING. Most of the works on Fruits, hitherto, have been intended mainly, either for orchard planters who allow their trees to take the natural form of standards, in which pruning is a matter rather to be avoided than insisted upon, in this climate; or else for cultivators with smaller space, whose limited time and means does not permit them to indulge in any of the special refinements of the art of horticulture, in the way of training or pruning trees—the methods generally practiced in the gardens of Europe, where labor is so vastly cheaper. The fact, too, that almost all the fruits of temperate climates bear excellent crops in many parts of the United States, with the simple conditions of a good soil and abundant air and light, has had a tendency to retard the introduction of what may be called the refinements of fruit culture as practiced abroad—viz: the pruning and training fruit trees as dwarfs, standards, pyramids, espaliers, and a dozen fanciful modes, some of which greatly add to their productiveness and value, while others are highly ornamental features in the fruit garden. The great value of these improved modes of training and pruning, is, indeed, not for the million, who plant fruit trees solely for the sake of getting fruit, with the least possible expenditure of labor or money on their part, but for the few who wish to get superior fruit by superior and improved modes of cultivation, and who take that kind of personal interest in their fruit garden, that makes daily attention to the growth of a tree, a source of continual pleasure and satisfaction.

No horticulturists at the present time, understand the art of pruning so thoroughly as the French, as we had ample opportunity of ascertaining by personal inspection last year. Mr. BARRY'S enthusiam on the subject of dwarf trees, pyramids and espaliers, was awakened by the same sight, and he accordingly gives his readers ample details, based on his own observation of the whole system of "*pinching*," and the cutting back of the young shoots—which constitutes the pith and marrow of the French mode—a system which we are forced to say is the best possible mode of pruning, since it *directs* the subject in the way it should go by means of foreseeing its future capacities and character, instead of allowing all growth to go at random generally, but occasionally coming down on the poor creature with a terrible onslaught of saw and knife, to the permanent injury of the constistution of the tree.

Our amateur readers who have carefully read the previous volumes of this Journal, are acquainted with the secrets of the pinching and shortening-back modes of pruning which lie at the bottom of the French practice, but they will also find Mr. BARRY'S work a most convenient hand-book of reference, when busy with the details of the art.

The author of the Fruit Garden very properly places M. DUBREUIL, the French Professor of Arboriculture, at the head of the masters of the art of pruning, at the present day, and quotes at length from that author the following admirable *expose* of his principles of pruning, which we copy here for the perusal and study of our readers interested in this subject:

"The theory of the pruning of fruit trees rests on the following six general principles:

"1. *The vigor of a tree, subject to pruning, depends, in a great measure, on the equal distribution of sap in all its branches.*

"In fruit trees abandoned to themselves, the sap is equally distributed in the different

parts without any other aid than nature, because the tree assumes the form most in harmony with the natural tendency of the sap.*

"But in those submitted to pruning, it is different; the forms imposed on them, such as espalier, pyramid, vase, &c., change more or less the normal direction of the sap, and prevent it from taking the form proper to its species. Thus nearly all the forms given to trees require the development of ramifications more or less numerous, and of greater or less dimensions at the base of the stem. And, as the sap tends by preference towards the summit of the tree, it happens that, unless great care be taken, the branches at the base become feeble, and finally dry up, and the form intended to be obtained disappears, to be replaced by the natural form, that is a stem or a trunk with a branching head. It is then indispensable, if we wish to preserve the form we impose upon trees, to employ certain means, by the aid of which the natural direction of the sap can be changed and directed towards the points where we wish to obtain the most vigorous growth. To do this we must arrest vegetation in the parts to which the sap is carried in too great abundance, and on the contrary favor the parts that do not receive enough. To accomplish this the following means must be successively employed.

"1. *Prune the branches of the most vigorous parts very short, and those of the weak parts long.* We know that the sap is attracted by the leaves. The removal of a large number of wood-buds from the vigorous parts, deprives these parts of the leaves which these buds would have produced; consequently the sap is attracted there in less quantities, and the growth thereby diminished. The feeble parts being pruned long, present a great number of buds, which produce a large surface of leaves, and these attract the sap and acquire a vigorous growth. This principle holds good in all trees, under whatever form they may be conducted.

"2. *Leave a large quantity of fruit on the strong part, and remove the whole, or greater part, from the feeble.* We know already that the fruit has the property of attracting to it the sap from the roots, and of employing it entirely to its own growth. The necessary result of this is, what we are about to point out, viz: that all the sap which arrives in the strong parts, will be absorbed by the fruits, and the wood there, in consequence, will make but little growth, while on the feeble part, deprived of fruits, the sap will all be appropriated by the growing parts, and they will increase in size and strength.

"3. *Bend the strong parts and keep the weak erect.* The more erect the branches and stem are, the greater will be the flow of sap to the growing parts; hence, the feeble parts being erect, attract much more sap than the strong parts inclined, and, consequently, make a more vigorous growth, and soon recover their balance. This remedy is more especially applied to espalier trees.

"4. *Remove from the vigorous parts the superfluous shoots as early in the season as possible, and from the feeble parts as late as possible.* The fewer the number of young shoots there are on a branch, the fewer there are of leaves, and consequently the less is the sap attracted there. Hence, in leaving the young shoots on the feeble part, their leaves attract the sap there, and induce a vigorous growth.

"5. *Pinch early the soft extremities of the shoots on the vigorous parts, and as late as possible on the feeble parts, excepting always any shoots which may be too vigorous for their position.* By thus pinching early the strong part, the flow of sap to that point is checked, and naturally turns to the growing parts that have not been pinched; this remedy is applicable to trees in all forms.

"6. *Lay in the strong shoots on the trellis early, and leave the feeble parts loose as long as possible.* Laying in the strong parts obstructs the circulation of the sap in them, and consequently favors the weak parts that are loose. This is only applicable to espaliers.

"7. *In espalier trees, giving the feeble parts the benefits of the light, and confining the strong parts more in the shade, restores a balance,* for light is the agent which enables leaves to perform their functions and their action on the roots, and the parts receiving the greatest proportion of it acquire the most vigorous development.

2. "*The sap acts with greater force and produces more vigorous growth on a branch or shoot pruned short, than on one pruned long.* This is easily explained. The sap acting on two buds must evidently produce a greater development of wood on them, than if it were divided between fifteen or twenty buds.

* This is not in all cases true. Peach trees, we know, left to themselves, exhibit a very striking example of the unequal distribution of the sap. The ends of the branches attract nearly the whole, leaving the lateral shoots and lower parts to die out. In other species, similar instances might be quoted, and as a general thing, the proposition is unsound, except in a comparative sense.

"It follows from this, that if we wish to obtain wood branches, we prune short, for vigorous shoots produce few fruit buds. On the contrary, if we wish to obtain fruit branches, we prune long, because the most slender or feeble shoots are the most disposed to fruit.

"Another application of this principle is to prune short for a year or two, such trees or parts as have become enfeebled by overbearing. (This principle deserves especial attention, as its application is of great importance.)

3. "*The sap tending always to the extremities of the shoots causes the terminal bud to push with greater vigor than the laterals.* According to this principle, when we wish a prolongment of a stem or branch, we should prune to a vigorous wood bud, and leave no production that can interfere with the action of the sap on it.

4. "*The more the sap is obstructed in its circulation, the more likely it will be to produce fruit buds.* This principle is founded on a fact to which we have already had occasion to refer, viz: that the sap circulating slowly is subjected to a more complete elaboration in the tissues of the tree, and becomes better adapted to the formation of fruit buds.

"This principle can be applied to produce the following result: When we wish to produce fruit buds on a branch, we prevent a free circulation of the sap by bending the branches, or by making annular or circular incisions on it; and on the contrary, when we wish to change a fruit branch into a wood branch, we give it a vertical position, or prune it to two or three buds, on which we concentrate the action of the sap and thus induce their vigorous development.

5. "*The leaves serve to prepare the sap absorbed by the roots for the nourishment of the tree, and aid the formation of buds on the shoots, All trees, therefore, deprived of their leaves are liable to perish.* This principle shows how dangerous it is to remove a large quantity of leaves from trees, under the pretext of aiding the growth or ripening of fruits, for the leaves are the nourishing organs, and the trees deprived of them cannot continue to grow, neither can the fruit; and the branches so stripped will have feeble, ill-formed buds, which will, the following year, produce a weak and sickly growth.

6. "*Where the buds of any shoot or branch do not develope before the age of two years, they can only be forced into activity by a very close pruning, and in some cases, as the peach, this even will often fail.* This last principle shows the importance of pruning the main branches of espaliers particularly, so as to ensure the development of the buds of their successive sections, and to preserve well the side shoots thus produced, for without this, the interior of the tree will become naked and unproductive, and a remedy will be very difficult."

The nicer operations of pruning and training are taught in France by means of lectures, with the trees before the pupils—the only rapid mode of teaching a practical art somewhat difficult of explanation upon paper. If our different states would establish agricultural schools, as they should do, the teacher of practical horticulture should have the whole modern art of pruning fruit trees at his fingers ends, and every pupil would, by the aid of a few specimens in different stages of growth, and a few small subjects to operate upon with the pruning-knife, soon become an accomplished master of the art. It is something, however, that must be pursued *con amore*. Mr. BARRY very properly says: "It is not, by any means, *labor* that is required, but attention, that the most delicate hand can perform; fifteen or twenty minutes at a time, say three times a week, during active growth, will be sufficient to examine every shoot on a moderate collection of garden trees; for the eye very soon becomes trained so well to the work, that a glance at a tree will detect the parts that are either too strong or too weak, or that in any way require attention. This is one of the most interesting features in the management of garden trees. We are never allowed to forget them. From day to day they require some attention, and offer some new point of interest that attracts us to them, and augments our solicitude for their prosperity, until it actually grows into enthusiasm."

Though Mr. BARRY is in many parts of the work plain and perspicuous, yet in others he glances so hastily and in so general a manner at important operations of culture, as to leave the majority of readers for whom his work is intended, somewhat in the dark. For

instance, *root pruning* is occasionally of great value as a remedial process in checking the growth of our luxuriant fruit trees, and bringing them into a bearing state. The following are the author's whole remarks on the subject:

"PRUNING THE ROOTS.—This is practiced as well to promote fruitfulness as to lessen the dimensions of trees. The roots, as has been shown, are the organs that absorb from the ground the principal food of the tree, and in proportion to their number, size and activity, other things being equal, is the vigor and growth of the stem and branches. Hence, when a tree is deprived of a certain portion of its roots, its supply of food from the soil is lessened, growth is checked, the sap moves along in its channels, is better elaborated in its leaves, and the young branches and buds begin to assume a fruitful character.

Roots are also pruned to prevent them from penetrating too deeply into the earth, and induce the formation of lateral roots near the surface, similar to the cutting back of a stem to produce lateral branches; the principal is the same."

Not a word is said as to the manner of performing the operation; how much of the roots of a young or old tree may be judiciously cut off; the best season of performing the operation, etc. Now, as root pruning is a far more dangerous operation in the hands of a novice, than any other kind of pruning, it seems to us a great oversight in a work in which the little details of practical culture are professedly entered into, merely to state the principle of the thing, and leave the operator wholly in the dark as to its practice.

Mr. BARRY is very non-committal and vague on the subject of diseases of fruit trees. The yellows "is supposed to arise from negligent cultivation." The pear blight may be "owing to an insect, a fungus, or some atmospherical cause," etc. We know it is far easier to take this ground than to risk one's reputation on points where there are so many different opinions—but readers do not gain much of an addition to their previous stock of knowledge by it. Quite contrary to our observation and experience, Mr. BARRY is of opinion that "to avoid the evil effects of the pear blight, the great point is to get a *rapid vigorous growth* before midsummer, when it usually happens." To get the growth before midsummer is certainly important, since a late growth is so frequently caught immature at the approach of winter, and suffers thereby, either in frost-blight, or in some other way —but we had considered it a pretty well settled point among American fruit growers who have studied this subject, that the great desideratum to *prevent* blight, is to place the tree in a condition where all "rapid and vigorous growth"—a growth always most liable to disease, and especially to the blight—should be especially guarded against, and a *moderate growth* of well-formed, short jointed wood, secured. It is because of the luxuriant growth of the pear on the rich deep soils of the west, that the blight is ten times more frequent and destructive there, than in eastern gardens, and it is because such varieties as the Seckel never incline to make a luxuriant growth, that they escape the blight that preys upon the more succulent and luxuriant shoots that are almost always found on some other varieties.

But we will undertake no more of fault-finding. We welcome Mr. BARRY'S book as in the main, one of sterling merit, abounding with excellent rules of practice, and a valuable hand-book for every real amateur of the fruit garden.

Domestic Notices.

UNNOTICED CHARACTERISTICS.—Among the peculiarities of well known plants which we do not remember to have seen noticed in any of the books, are the following:

The flowers of the *Bignonia capreolata*, (buff or tawny flowered trumpet vine of the south—a handsome climbing shrub, very distinct from the common trumpet creeper which has bloomed finely in our garden, in the open border trained to a pole,) have precisely the odor of *liquorice*.

The flowers of the Umbrella Magnolia, (*M. tri elata*,) open regularly about four o'clock in the afternoon. This tree should be planted on the lawn, so that the effect of the flowers and foliage can be seen at a distance of fifty or 100 feet. Near by the flowers look coarse—but seen at a distance, each blossom set in its terminal tuft of broad foliage, they suggest water lilies in ther peculiar way. This tropical-looking magnolia will grow as far north as the Isabella grape ripens, and it needs only a rich loamy soil to thrive well; it deserves to be more extensively planted than it is at present.

CRYPTOMERIA JAPONICA.—Mr. BUIST informs us that this tree, which has been twice noticed in our pages, as not being hardy about New-York, is perfectly hardy at Philadelphia, and has ripened seeds there. We have seen a specimen lately in the grounds at Wodenethe, the seat of our neighbor H. W. SARGENT, Esq., which has stood the past winter quite uninjured, and is now very healthy. It is not improbable that grafted upon some of our native Junipers, the Cryptomeria may prove entirely hardy.

BOHEMIAN OLIVE.—Dr. VALK, of Flushing, Long Island, informs us that the *Oleagnus parviflorus*, sometimes called the Bohemian Olive, proves to be a hardy shrub in his garden. The following extract from his letter will interest our arboricultural readers:

"I would bring to your notice a very fine plant in my garden—and I believe a very rare one on this side of the Atlantic—the *Oleagnus parviflorus*. I received it when very young from the garden of the London Hort. Society, and planted it immediately in the open ground, where it has grown to a large bush, and now bears every season a heavy crop of fruit. This fruit is pretty in appearance, and pleasant in flavor. The shrub is a native of Bohemia, and I think might be very much increased in size by judicious cultivation. Its English name is, I think, the Bohemian Olive.

My Deodar Cedar has grown luxuriantly; is now ten feet high, and beautifully feathered to the ground. It has been planted and fully exposed four winters, and is not exceeded in beauty by any of its kindred evergreens." Yours, W. W. V.

A SPECIAL MANURE FOR EVERGREENS.—It is well known that most evergreens are impatient of the ordinary animal manures, applied with so much benefit to deciduous trees, and the zealous cultivator is often at a loss to know how to urge the slower sorts of firs, pines, &c., to a more luxuriant growth.

We have experimented a little on this subject, and think we have found a most valuable stimulant for all rare evergreen trees in ornamental plantations.

Two years ago, the Lodi Manufacturing Co., Liberty-st., New-York, (whose excellent poudrette, we have already recommended,) sent us for trial a cask of "manure for shrubs and trees," requesting us to make trial of it. It presents to the eye the appearance of a finely pulverized gray powder, and is quite dry to the touch. We applied it to a variety of trees and shrubs; in the majority of cases it seemed to act simply as a good manure, with no effects in any way remarkable. But to our surprise it acts mosts distinctly and beneficially upon all *evergreens*. Pines, Firs, Deodars and Spruces, that had made but a feeble growth for some seasons, when liberally dressed with this mixture, put on a darker green and made more luxuriant shoots than they had ever done previously. Encouraged by this we used the mixture liberally, in planting young evergreens the past spring—mixing three or four shovelfuls to the soil used in planting young Deodars, Araucarias, and the like. The effect was very soon

perceptible in the darker hue of the foliage, and now, at midsummer, in the greater luxuriance of the growth. We have no hesitation in recommending this "manure for shrubs," as a capital top-dresser for evergreen plantations, and as an especially valuable manure for using in the process of transplanting evergreens. We understand it consists of a small quantity of poudrette, and a considerable portion of mineral manures adapted to the growth of trees generally.

Seventeen Year Locusts.—The hum of this singular insect fills the woods and gardens of Maryland at the present time, and the country there is alive with them. Though the Seventeen year Locust only appears during this long interval, the people of the districts favored by the visitation, congratulate themselves that the visits are so few and far between—for neither the ceaseless drone of the insect, nor the havoc it causes in ploughing up the young branches of trees, are among the pleasant experiences of country life.

It is a mistake of many persons to suppose this insect feeds upon vegetation. It feeds upon nothing during its three or four weeks of existence above ground, but is occupied solely with paring, singing its song, (or more correctly *beating its drum*—which is really the way in which the sound is made,) and laying its eggs in the tender branches of the trees. These young branches, which finally strew the ground beneath the trees, fall from the trees, broken by the winds at the weak place made by the punctures of the female in laying her eggs—and are not eaten off by the insects as many suppose. The actual food of the Seventeen Year Locust is made long beforehand, and consists of the *roots* of trees, as it appears by the careful examination of naturalists. Miss Morris, of Germantown, well known for her investigation of insect habits, has well settled the point that these locusts are a busy devourer of the roots of trees when they descend and take up their long abode underground. She thinks, from examination of the roots of many trees in the locust districts, that the larvæ do more harm upon the roots of trees in this way, than the full grown insects do upon the branches. Doubtless many a fine tree, whose decline is a source of surprise and perplexity to the cultivator, is the prey of these creatures at the root.

Fortunately the *Cicada Septendecem* does not occur all over the country at once—but in different portions upon different years. There is no longer any question, however, as to the fact that each brood remains seventeen years under the surface of the earth. The insect is not a true locust like our annual insect of that name, or those which ravage the East, devouring the herbage, but a *Cicada* or larvent fly—equally as large and a good deal resembling a true locust.

Healthy Apricot Trees.—*Dear Sir*—Observing the weight you give to shielding tender trees from the sun in summer, and rapid freezing and thawing in winter, I was induced to apply the practice to my apricot trees—the only fruit trees that uniformly have baffled my attempts at successful cultivation. The trouble with this tree, as many of your readers must be aware, is that it "goes off" very suddenly, and usually some time between the exfoliation and the beginning of summer. There can be little doubt that this is owing to the effects of heat and cold upon the bark—as you have pointed out. To guard against it I have employed old cotton bagging, a material easily and cheaply obtained by those who live near cities. I cleaned the bark with soft-soap, and dipped the cloth just before using, into a thin white-wash, both to preserve it and prevent it from harboring insects. I then tied it loosely but neatly round the stem and the larger and lower part of the branches. This has been upon the trees three years and now requires renewing. It has answered the purpose well. The trees are remarkably healthy, and both foliage and fruit have been unusually large. Not one of the trees so covered has been attacked by the paralysis, common to the apricot, while others not covered, in an adjoining garden, have been dying off every season in the usual way. If you think the foregoing worthy of being printed, it is at your service. Yours, A. W. *Philadelphia, June*, 1851.

Daphne odora hardy.—We are extremely glad to learn by the following extract from a letter from Mr. Thorburn that this plant has proved hardy on Long Island. There can be no doubt that Chinese azaleas, raised from seeds, and planted out in a shaded border while young, would also prove hardy, and what a beautiful ornament to the shrubbery and flower garden

they would be. There are still many plants in our green-houses that may be successfully naturalized.

The *Daphne odora* which I last autumn informed you had stood out all winter in the garden of Mr. BENNER, has again proved its robustness, and has *flowered* this season. I consider this a valuable experiment, as it is making a garden shrub of what was hitherto considered a tender green-house plant, and which is certainly one of the most delicious of all plants in its fragant flowers. Yours truly, G. C. THORBURN. *Astoria, May* 28, 1851.

PRESERVING CHERRIES FROM BIRDS.—DEAR SIR: If you or any of your readers ever "loved a tree or flower," and especially a cherry tree on your own premises, covered with a fine crop of particularly early fruit, which you had set your heart upon enjoying, only to see the spoiler come in the shape of a parcel of little cedar birds, or "ring tails," to make a desert of your cherries before you could get a fair chance to pronounce them ripe, you probably understand someting of the sufferings of such disappointed hopes. As these young Ishmaelites of "ring tails" make their breakfast on my Early Purple Guignes and Bauman's May every season, I have been a little provoked at them, and at last have succeeded in baffling them, by suspending three-cornered pieces of new bright tin, about as large as my hand, among the branches. These bits of tin may be had from the tin shops for a mere trifle, or if you take the refuse pieces—for nothing. Punch a hole in one corner, and suspend the tin by a piece of twine from one of the outer branches, so that it may swing freely. As it turns it will catch the light and sunshine, and frighten off the robbers. A neighbor, who never does things by halves, has improved on my mode by smearing a branch or two of each tree with bird-lime. This detains one or two of the little thieves now and then, til he makes a sign of distress, which, connected with the *awful* brightness of the tin, induces them to give the tree a "wider birth," as the sailors say. W. *Boston, June* 8, 1851.

THE CURCULIO WARFARE.—If the curculio, as is generally believed, emerges from the ground, immediately under the tree whose fruit it destroys, might not the insect be thoroughly eradicated by *burning?* For example, the trunk could be protected by one or more old stove pipes, stuck in the ground at a little distance from the tree, and the *mellow soil* hoed up, and incorporated with saw dust, tanner's bark, or something similar, in proper quantity, which being set fire to, would destroy all insects, without penetrating to the roots of the tree. By doing this at the proper season, would not this pest be exterminated at once and for ever? GEORGE LESLIE. *Toronto, Canada, 26 May,* 1851.

Not a bad suggestion for small gardens where there are but a few trees—and where the curculio does not migrate from other quarters. ED.

STAMINATE STRWBERRIES PRODUCTIVE.—In the may number of your Journal Mr. Longworth of Cincinnati, in an article on Grapes, says: "That neither Hovey's Seedling or the English Methven Scarlet, will produce half a crop, or bear perfect berries, if separated from all others."

He then goes on to say, that the same may be said of Burr's New Pine. Of the two first I cannot speak, never having cultivated them, but with regard to the New Pine he is certainly in error.

Two years ago I procured a few plants of the New Pine direct from the garden of Mr. Burr, in Columbus. They came into full bearing this year, and are now producing a very full crop of berries, of the largest and most perfect kind, without the assistance of "any others."

In this matter there can be no mistake, I never having grown any other variety of strawberry, nor are any other kinds cultivated within a *quarter of a mile* of my residence. S. H. WEBB. *Newburgh, Ohio.*

[Such cases do sometimes occur, but our Cincinnati friends *ignore* them. ED.]

BUDDING ROSES.—DEAR SIR: July is the month for budding roses, and I wish a little space among the Domestic Items to recommend this practice to rose amateurs. The common mode of budding rare roses on stocks near the ground is so familiar that it needs no mention here. What I would like to recommend to the readers of the Horticulturist is, the practice of budding ever blooming roses on the Prairie climbing roses. The effect is, I assure you very beautiful. You select, about the 10th or 15th of July, long, clean straight shoots, or

flourishing young side shoots, on your Prairie rose, which I will suppose trained to a pole ten feet high, or against a wall. You insert buds of the Bourbon and Noisette roses—or of the Perpetuals; I find the former the best. Next spring you head back the shoots to a point an inch or so above the buds that have taken. The vigor of the prairie stock soon forces these buds of the ever-blooming roses into luxuriant growth, and they will speedily be covered with flowers. By selecting half a dozen of the most striking colors and contrasts, and budding them at different heights on the Prairie climber, you have one of the richest pillars of roses conceivable—blooming more or less all the season. In pruning the pillar you do not sacrifice the Prairie rose itself—but allow it to bear a considerable number of its own flowers, only keeping down its strongest shoots, so as to throw the necessary amount of nourishment into the budded shoots.

I find the following varieties succeed admirably in this way. *Aimee Vibert*, (Noisette, pure white;) *Madam Desprez*, (Bourbon, deep rose-color, in large clusters;) *Malmaison*, (Bourbon, delicate blush white;) *Mrs. Bousanquet*, (China, creamy white;) *Bouquet de Flore*, (Bourbon, bright crimson.)

When the Prairie *mother* is a large plant and a strong grower, it is better to top back the shoots to within three or four buds above where the new bud is inserted, at the time of performing the operation. This throws more nourishment into the bud. It should not, however, be topped near the inserted bud, as that would force the latter into immediate growth, which is not desirable. Your Friend, *S. Philadelphia, June* 15, 1851.

Mass. Hort. Society.—We notice by the reports of the Exhibition, that J. F. Allen, Esq. of Salem, exhibited very fine hot-house grapes in six varieties, as early as the 31st of May. Messrs. Story and Hovey & Co., also exhibited fine grapes—the Wilmot's Black Hamburgh, of the latter, particularly good.

Col. Wilder made a very fine display of 120 blooms of Tree Pæonies—in all 18 varieties of this choice flowering shrub. J. S. Cabot, Esq. also exhibited nine choice varieties of the same. Messrs. Hovey exhibited 30 varieties of Chinese azaleas, and Messrs. Winship a very large collection of blooms of fine shrubs and herbaceous plants.

At the show on the 7th of June, Mr. Allen produced four varieties of Figs in perfect maturity—with Hunt's Tawny Nectarine, and a fine new cherry called "Ellen." There was also a good collection of grapes and other fruit from Messrs. Bowditch, Strong, Hovey & Co., and Williams. Mr. Lovett showed 15 mammoth stalks of the Victoria Rhubarb, weighing 24 lbs. Some of the stalks measured 45 inches long. Messrs. Winship showed 12 stalks weighing 16 lbs.

Mr. Downing—Sir: It is a rainy day, and therefore I can now send you my observations of this last winter and spring, with respect to my European grape-vines, and the grafts of European cuttings on the American wild stocks. Generally speaking, the grape-vine cuttings and rooted vines, planted very late last year, (indeed some as late as June, that escaped the great drouth during last summer,) are doing very well, and many of them have a fair average crop and promise well for the future.

The grafts of last year have, like the wild native grape-vines, put out about three weeks later than their parent European stocks; showing decidedly the positive influence of the wild native vine upon the European grafts, since their circulation has been retarded. Their wood is now already loaded with bunches of grapes in their embryo condition. This last February I have grafted about 100 more, and they are already nearly all putting out. To show you the great power of my wild vines, I may simply state that by my method of grafting, I have 31 grafts on one wild stock, and I have another that has sixty European grafts of many kinds.

In your remarks you stated that the grafts would not be influenced by the native wild stock on which I had grafted the European cuttings.* So far, my experience does not sustain your views; and I am glad to be able to say that nature and experience would not support your ideas.

I find that my experiment and views respecting the power of the *nurse stock* in modifying the habits of the nursling are neither singular nor original with me—that Compte Odart, that

* Our correspondent somewhat mistakes us. We know of course, that the habit of growth, etc., will be slightly modified by the stock—but the latter will fail to naturalize the foreign grape to our climate—the point desired. Ed.

great practical writer in his "*Ampilographie*," or a treatise on the classification of the vine, at page 291, at the article "RAISIN DES DAMES," says: "This magnificent grape of a very beautiful yellow color, with very big ellipsoidal berries, has indeed some failings; it does not bear every year; its beautiful bunches are often very thinly furnished with berries owing to the blight of at least four-fifths of them, and their flavor is not very high; *I have found the means to remedy the blight*, (coulure,) *and this is by grafting it on* a common white Muscat."

I shall add to this statement of facts the opinion of one no less celebrated than l'Abbe ROZIER, as published in his 10th 4to. vol., page 248, of his complete treatise on agriculture. He says, "Grafting on the vine takes with so much ease, and *anasthimoses* so perfectly, that no other kind of plant appears better calculated by nature for this mode of improvement (*deperfection ;*) and they would have us believe that this operation deteriorates the quality of the grape while it improves that of other fruit! That is not possible. Graft the Muscat on a Chasselas, and then compare the quality of its fruit to that of the Muscat not grafted, and you will be forced to admit that the produce of the graft is superior; make the same trial with the Mourillon on a Chasselas and you will see that grafting *adds* to the quality of the grape." These, sir, are very important facts and worthy to be recorded in your valuable publication for the benefit of Horticulture. So you see that I was not so singular in my notions: if I err I am in good company. I may also state for your gratification, that one of the grafts of last year has on it about 100 bunches of grapes of remarkable sizes, and that the others have bunches in proportion to their size.

I have just read Mr. N. LONGWORTH's letter in your April number, and the facts he states in it, he had the kindness to communicate to me two years ago. I must, however, and with all due respect for that gentleman's valuable experience, *in Cincinnati*, remark that his experience and conclusions must be limited and confined to the latitude of his *locality*. Whilst my vineyard is located 6° farther south, and I may say very near and almost on a level with the ocean. Again my rolling land, the proximity of a river, a calcareous subsoil resting on beds of very rich white and grey marl, much of it mixed with abundance of oxides of iron and alumina, clay of every possible kind mixed in different proportions with gravel and silicious sand, green sand, muck, &c. &c., each and all of which have their share of influence in my trial. [Undoubtedly these are most favorable circumstances, and we shall be glad to hear of your success. ED.]

Now, sir, you may be able to judge and understand the difference and advantages of my locality over that of the environs of Cincinnati. To the 8° Fahrenheit, at least, difference in the temperature, I may add the warm quality of my soil and its hygroscopicity so favorable to the grape-vine, and which is also the best remedy for the rot. In consequence of it I was able to mature last year, even the Muscat de Frontignan in 145 days after the vine was first planted, and just after a long sea voyage. The minimum number of days, even in the south of France being 140, and the maximum about 160, with an accumulation of 6000° F. in that same space of time, with also the *indispensable* minimum temperature possible, that comports with the perfect growth of the vines. See Compte de Gasparin's book on agriculture, 4th 8vo. vol. Very resp'ly, JOSEPH TOGNO, Principal of the Vine Dresser Model School, near Wilmington, N. C. *April* 8, 1851.

A. J. DOWNING, Esq.—I enclose Adam's & Co.'s receipt for a box of Catawba wine, which I hope you will receive from me as a slight token of respect due to you for the interest you have taken in the grape culture of the west. Six bottles are Mr. LONGWORTH's sparkling Catawba, (the best of that kind made here as yet by any one,) and six of still wine from my own vineyard, vintage of 1849. I think my vintage of 1850 will be better.

We have ready sale here for the sparkling at $12 per dozen, and for the still at $6, of the best quality of course, inferior at less rates.

The great frost of the morning of the 2d of May, made a general sweep of all the fruits in the west and south-west—with the exception of some parts of the southern shore of Lake Erie, near the lake. A few late apples, (Rawle's Janet,) may be spared to us.

The grapes have fared better, not more than *half* the shoots being destroyed. Latent buds will push out new shoots of course, but whether

productive, (or fruit bearing,) I am unable to say. I expect, however, a pretty fair crop—*not excepted.*

This frost has proved conclusively, that of all *important* fruits, the grape is least subject to injury from that cause.

This frost is the most destructive we have had since the 26th of April, 1834, (which was also *locust* year,) and very similar in its effects; the vegetation was then a little more forward than now.

On the morning of the 2d instant the average range of the thermometer in this vicinity, at 5 o'clock, was about 24½. Very repectfully, R. BUCHANAN.

N. B. We find here, that a glass or two of the still Catawba at dinner, prevents acidity on the stomach—and that two or three at the same meal, is very useful to those afflicted with dyspepsia. The pure article is often prescribed by our physicians. R. B. *Cincinnati, May* 9, 1851.

We are greatly indebted to Mr. BUCHANAN for his very acceptable present of these wines. In flavor, the Ohio wines very closely resemble those of the Rhine, and the Catawba grape gives a peculiar fruity flavor which is fast gaining the approbation of good judges. About Cincinnati, the shores of the Ohio are thickly dotted with vinevards, and there can be little doubt that the calcareous soil and warm climate of that region will soon give us American wines that will rank with any of the same class produced in the world.

Very few Americans, except those who have traveled abroad, estimate properly the moral value of pure light wines—because *pure* wines very rarely find their way across the Atlantic.

Containing, as hocks and clarets do, only about eight or nine per cent of alcohol, they are far more wholesome than coffee; and the cheap production of such wines* will do more to decrease the consumption of ardent spirits, than any other circumstance. Neither law nor morals can be brought to bear on the present age so as to *force* men to be entirely temperate—but the introduction of wholesome, pure light wines, at a cheap rate will—as there is abundant proof in the wine districts of Europe. It is for this reason, as well as because we look upon it as a source of national wealth, that we regard the successful labors of such men as Mr. LONGWORTH and Mr. BUCHANAN, in introducing and perfecting the wine culture, as worthy of the highest public gratitude.

* We understand that the light Catawba wine of the ordinary grade, may be had for about 30 cents a bottle in Cincinnati.

PEACHES AND NECTARINES ONE SPECIES.—Enclosed I send you an account of a curious union of the Peach and Nectarine, which was found on a farm but a few miles distant from this place, last summer. I did not have the pleasure of seeing it myself (being out of the way at the time,) but as a very singular specimen, it was forwarded to one of our most distinguished botanists in Charleston, by whom the accompanying description was furnished to one of the city papers. As the account will prove interesting to pomologists generally, I have thought it worthy of a more permanent record, especially as it would be seen by comparatively only a few, in the paper in which it appeared. I would have furnished you with a copy at the time, but that you were travelling in Europe, and when remembered after your return, I could not find the one I kept for some time. I send you all that was published and you can insert the whole or only such parts as you may think proper. I shall endeavor to ascertain whether any such are produced this summer, and should there be, will try and forward a specimen to you. I remain, yours, &c. J. D. LEGARE. *Aiken, S. C., March* 31, 1851.

We yesterday received from Aiken, for which we are indebted to the kindness of Mr. DAWSON, a specimen of fruit of so singular a character and presenting a peculiarity which occurs at such rare and uncertain intervals, that we request a small space in your paper for a brief description.

We cannot characterise this fruit more accurately than as half a peach and half a nectarine, united by a seam running around and through the fruit, by which it is divided into nearly equal parts. The fruit was of moderate size, and was taken from a peach tree—it having been the only one that presented this peculiarity. All the rest were genuine peaches. It was what is usually called a cling-stone, viz: the pulp adhering to the stone. On one side of this fruit was, in all its peculiarities, a nectarine. It had a smooth skin of a rich dark red color, possessing the fragrance of that fruit, and it was ascertained on being tasted by several good judges, that it had all the flavor of the nectarine. The other half was in all its particulars a peach, with its down, fragrance and flavor.

The seam which separated the two halves of the fruit was very distinct—on one side the nectarine protruded, whilst on the opposite edge the peach swelled out and the nectarine receded, presenting the appearance of half a peach and half a nectarine, not regularly placed together, but slipped a little to one side, and then united by a subsequent growth. The stone was on the peach side deeply furrowed and corrugated, as is the case in the peach stone, and on the other less indented and more smooth, as in the nectarine. We had some expectation of finding a double kernel, but in this we were disappointed. It is a single kernel, well filled, and which we have planted, although, even should it produce a tree, we have little expectation of its bearing similar fruit.

An interesting inquiry still remains for the consideration of botanists. By what process in nature has this fruit been produced? We were infromed by our friend President FINLEY, who sent us a communication which accompanied the fruit, "that it grew on a tree of MR. ZEAGLER's about ten or twelve miles from Aiken, and that there were no nectarine trees on the farm."

It has now been fully established by botanists, that the peach and nectarine are mere varieties of one species, (*Amygdalus persica.*) These varieties are only preserved with their separate peculiarities by budding, grafting on the roots, and other artificial modes. Bees and other winged insects, are known to carry the pollen of fertilizing dust to great distances, which is communicated to the pistil. Hence, in our apples, pears, peaches, plums, corn, &c., we cannot calculate with certainty on a product similar to the original fruit. We cannot account for the peculiarity in this nectarine-peach on any other principle than that of a double fertilization of the pistil by a bee or other insect, and that whilst the pollen of the peach communicates its peculiar properties to one side of the fruit, that of the nectarine was conveyed to the other. The occurrences, however, are as rare as that of a somewhat analogous phenomenon in the human subject. We recollect having read in the Horticultural Transactions, vol. 1st., of a single fruit having been produced with the coat of the peach on one side, and that of the nectarine on the other, but have no opportunity of referring more particularly to that work. It was also, we think, stated that in one instance a tree was produced which on one side had the downy coat of the peach, and on the other the smooth bark of the nectarine. This is repeated in a recent English work—Description of Vegetable Substances, Fruits, &c., 297. B.

NEW ZEALAND SPINACH.—A correspondent who is a good judge of *greens*, complains that we have never recommended one of the most valuable of all the tribe—especially for summer use—the New Zealand Spinach, and sends us the following note of this plant—the seeds of which may be had at THORBURN's or any other of the large seed stores. ED.

New Zealand Spinach, (Tetragonia expansa,) so called, because it was found growing wild on the shores of New Zealand when Captain Cook first touched at that island. Although the natives made no use of this plant as an esculent, the naturalists who accompanied the expedition were induced to recommend it as a vegetable which might be safely eaten, since its appearance and general characteristics were so similar to the Chenopodium. On trial, it was found to be both agreeable and wholesome. Sir Joseph Banks brought it into culture in England in 1772, and it has subsequently been found to be a much more hardy and valuable plant than was at first supposed. It was at first treated as a green-house plant; but now grows freely in the open garden, and indeed seems already to have naturalized itself in the south-west of England. A writer, from Exmouth, observes, in the "Gardener's Magazine" for February 1829, "The New Zealand Spinach is quite a weed with us, as, wherever it has once grown, plants rise spontaneously, even when the seeds have been wheeled out with the dung in the the winter, and again brought in as manure in the spring. I have now a full supply of it in my old pink bed." This Spinach has an advantage over the common sort under cultivation, in producing an abundance of large and succulent leaves during the hot weather, when the latter plant runs almost immediately to seed, and produces little or nothing. It is likewise milder in flavor, and of so rapid growth, that a bed with about 20 plants is sufficient for the daily supply of a large family. Though by some called a biennial, this Spinach is an annual in our climate. The stem has numerous thick and strong branches, somewhat procumbent for the greater part of their length, but raised at the points. The leaves are fleshy and succulent, three or four inches long, of a dark green on the under part, but of a paler color on the surface, on which the midribs and nerves are strongly marked. They are triangular, or rather of an elongated heart-shape, having the angles at the base rounded, and the apex sharp and extended. The flowers are small, and of a yellowish green color; they appear in August and September. The whole plant is thickly studded with minute aqueous tubercles; a peculiarity likewise to be found in some species of atriplex and chenopodium. In six weeks after sowing, some of the leaves of the plants are fit for gathering. These are pinched off, and not torn from the branches. This plant has been likewise found growing on the Tonga islands; and Thumberg discovered it of spontaneous growth in Japan. New Zealand Spinach is remarkable as being almost the only native of the isles of Australasia which has been found worthy of a place in the kitchen-gardens of Europe.—*Rhind's Vegetable Kingdom.*

BRIDGMAN says, "its nature seems to be

opposite to the common Spinach, as it will endure the heat better than the cold. It may be obtained in the summer by planting the seed in April or May—(*he might have added June.*) Being of luxuriant growth, it should be planted in hills three feet apart and about two seeds in a hill. The leaves will be fit for use during the summer and until late in the autumn." Yours, E. *New-York, May*, 1851.

PROF. HARRIS ON THE CURCULIO.—This able entomologist has sent the following letter to the Boston Cultivator, as a guide to cultivators. As the recommendation of one who has studied the habits of this insect very thoroughly, it is worthy of attention.

MR. EDITOR:—These depredators have begun their summer work in good earnest. On the 27th, I saw cherries not bigger than small peas, and plums still smaller, that had been stung; and the next day, shaking brought down the weevil from a plum tree. From the appearance of the fruit, the weevils must have been busy a week or more ago. Those persons who wish to save their plums and cherries, should immediately begin to use such means as may prove best for protecting the fruit.

Showering the trees with lime-water, or throwing the fluid upon them with a syringe, till it forms a white coat on the young fruit, is said to be an effectual preservative from the attacks of the plum-weevil. It may be asked, however, whether we shall not have to shower our cherry trees and our apple trees, also. It is a well established fact, that the plum-weevil attacks all the following fruits, namely: plums, cherries, apples, nectarines, apricots, and peaches and even walnuts. The whitewash may protect the plums, but the other fruits will be only the more sure to suffer, unless protected in like manner; and, when it comes to showering big trees and whole orchards in order to save the fruit, we shall begin to make unfavorable estimates of the cost and of the time required.

Sprinkling salt upon the surface of the ground has been repeatedly recommended, and some cultivators have applied it abundantly to the soil around plum trees; but it seems with very doubtful results. Some of us have lately had an opportunity of testing the efficacy of sea salt on a large scale, where our gardens (as was the case with mine) have been thrice overflown by the sea, during the high tides of last April. We shall soon find out whether the brine will have any effect upon the weevils, or will do our trees good in any other way. It is not yet time to make up an opinion thereon.

Of other remedies I can speak with much confidence—of those whose object is to *kill the* insects outright, in whatever form they may be found. We may begin the slaughter by taking the insects during the season when they employed in laying their eggs, or stinging the fruit, as this process is commonly called. Let a large sheet, divided half way through the middle, be spread under the the trees, every morning early, and every evening after sunset; then, if the tree be suddenly jarred by a few smart blows, the weevils will drop upon the sheet as if *dead*, looking in their motionless state, like little blackish buds. Gather them up immediately, and throw them into a tin pail having a little water therein, and when the gathering is finished, put them into the fire. Most of the insects thus caught napping, will be found to be females; and, as each female lays a large number of eggs, it is apparent that in this way, we shall nip the future brood in the bud. Plum trees, peach trees, and cherry trees, when not too large, and small apple trees, may thus be protected to some extent. But, as the weevils fly well, especially in the middle of the day, we may expect to be visited by some from the gardens and orchards of our neighbors, and even from others distant half a mile or more. The remedy, to be effectual therefore, requires to be universally adopted.

Let swine be suffered to go at large and to root in the old orchards, and they will do their part in killing and eating the weevils while in a chrysalis state in the ground. Gather up all wind-fallen, immature and wormy fruit, daily, or twice a day, put it into barrels or tubs, and pour boiling water over it. Let this be done faithfully by every owner of a fruit tree, and my word for it, there will soon be a sensible diminution of the number of the insects; and a much greater amount of sound fruit will be produced. This simple remedy can be employed by almost every one, at a comparatively trifling expense. It is because it has been so much neglected, that we now have so much wormy fruit; and the evil is evidently very much on the increase.

There are, in fine, but two resources that come within our power; either to make a general business of *killing* destructive insects in their season, by direct attacks upon them in their various forms; or, to *starve* them to death, by cutting down all our fruit trees. T. W. HARRIS. *Cambridge, Mass., May* 30, 1851.

Answers to Correspondents.

PERPETUALS.—*Rosa*, (Saratoga, N. Y.) You complain of the non-blooming of your perpetual Roses. It is doubtless owing to the want of food. You should take up the bed this autumn, dig out the whole of the soil and subsoil (i.e. the second foot of soil) and fill up its place with stable manure mixed with one-half loam. Then replant the roses and they will bloom plentifully all next summer—especially if you keep the bed rather low, so as to catch and hold the summer showers. All that you

can do this season is to cut back three or four inches, the ends of the shoots that have flowered, fork up the bed and drench it liberally with liquid manure once or twice. This will start the plants into new growth and with that comes more flowers of course.

Rare Trees.—*W. Wilson*, (New-York.) The Virgilia is a native of Kentucky, and is perfectly hardy in any part of the northern states. It is one of the handsomest of all ornamental trees—whether we consider its fine foliage or its lovely white blossoms. It is scarcer in the nurseries than it should be—considering the fact that there are several trees in the gardens about Philadelphia that bear seeds abundantly. *J. M.*, (Buffalo.) The evergreen alluded to is the Himmalayan spruce (*Abies Smithiana*) perfectly hardy and unsurpassed among spruces—being much more beautiful than the Norway spruce, in the same way. *Pinus excelsa* proves as hardy as the common white pine. The European Judas tree (*Cercis siliguastrum*) has larger and finer flowers than our native species. Plants may be had of Saul & Co., Newburgh.

Sickly Orange Trees.—*A. P. J.*, (Baltimore.) Bad soil is undoubtedly the cause of the sickly state of your yellow leaved orange and lemon trees. Take them out of the tubs and shake off a good part of the soil from the roots. Repot them in a mixture of one-half good rich loam—the top spit of a rich turfy pasture—one-third decomposed cow manure and one-third fine charcoal with a little sand. Shorten in the branches all over the head, place the tubs in a shaded situation (on the north side of a building)—and water them plentifully as often as they appear dry.

Espalier Fruit Trees.—*N.*, (Boston.) Your gardener has injured your trees by excessive pruning. Being a Scotchman he was taught training and pruning in a damp climate with a covered sky, and pursues the same system here where we have a dry climate and an unclouded sky. If he will take a hint from nature on this side of the water and leave more wood and leaves, his trees will regain their health. A south exposure we consider on the whole the worst for trained fruit trees.

Cockroaches.—*A Kitchen Gardner*, (Jersey City.) The following is given as an excellent mode of destroying these creatures. "Miz 1 oz. of arsenic with 4 oz. of tallow, and melt them together. When thoroughly incorporated by stirring and partially cooled, small pieces of wood should be dipped in the mixture which will form a coating over the wood. If these pieces of wood are placed in the kitchen where the cockroaches are, they will eat them greedily and perish."

Red Spider.—*A Novice.* The sickly yellow appearance of the foliage of the grapes in your vinery is caused by that pest the red spider. The only remedy for it now, is to dust the under side of the leaves with flower of sulphur. But you should have prevented it by keeping the air of the vinery moist during the hot weather, by frequent syringings and sprinkling the floor with water.

Names of Plants.—*J. G. S.*, (Rose Hill, Va.) The Clematis with a large pale blue flower from the Blue Ridge mountains, of which you enclose a specimen in bloom, is the American Atragene (*Atragene Americana*) one of the Clematis tribe—and one of our prettiest native climbing shrubs. The buck-eye of the western states is a species of horse-chestnut.

To Destroy Ants.—Will you please to inform me through your valuable journal of some method for destroying ants. After repeated doses of whale oil, soap, tobacco water, lime, ashes, and snuff, they still continue to operate destructively upon Osage Orange hedge plants and other things which are not so strong as to bid them defiance. I am quite discouraged and would be greatly obliged for information. Yours resp., *A Rochester Subscriber. June* 14, 1851.

Tobacco water if made strong enough, and a very *little starch* mixed with it, will destroy them on the young shoots. Ed.

Horticultural Societies.

Pennsylvania Horticultural Society.—The stated meeting for May, was held on the 21st. The saloon was thronged with visitors, who assuredly must have been gratified with the display, which consisted of extensive tables covered with beautiful flowering plants and culinary vegetables, in the greatest profusion. Of the former, Peter Mackenzie exhibited (not for competition) a handsome collection of Calceolarias, Fuchsias, Cinerarias, and a large specimen of Azalea variegata, completely enveloped with its rich and resplendent flowers, an object of great attraction. Robert Buist, an extensive collection of Pelargonia, many of which were of the new fancy varieties, and all of the choicest kinds; new Calceolarias, fine Azaleas, and several plants of recent introduction, and now for the first time brought into notice. The Tetratheca verticillata, a pretty delicate plant, with very narrow leaves in whorls, and fine cerulean flowers; Henfrya scandens bearing clusters of white flowers; Centranthus microsiphon, a very showy seedling mimulus of rich colors, which he names "Jupiter;" Azalea coronata, with other fine plants. Jno. Lambert's gardener exhibited fine specimens of Rhododendron ponticum in full bloom, Camellias, Pelargoniums, Cinerarias, etc. Benj. Galliss and William Hall each presented tables of choice roses. A large basket of the choicest cut flowers was shown by the President's gardener; also ripened grapes of the white Constantia and Chasselas of Fontainbleau varieties. J. M. Page, of Burlington, Strawberries. Two seedling apples of merit from Berks county were seen, and specimens of the Loquat by Mrs. J. R. Latimer of Wilmington. Among the vegetables were observed very fine cucumbers from Geo. W. Carpenter, Germantown, Saml. C. Ford's, Isaac Newton's, Delaware county, and Harry Ingersoll's. Rhubarb of gigantic proportions was brought by Saml. Cooper, Henry Cooper, William Hobson and others. A display of cauliflowers from the Asylum for the Insane, which for beauty and extent has never been surpassed. Superb Asparagus by J. M. Page, Burlington, and large displays by Anthony Felton, Jr., Miss Gratz's gardener, John Lambert's gardener and a few varieties by Wm. Johns.

The usual stated meeting for June, was held on Tuesday June 17th. The exhibition was very good for a summer month, when few green-house plants are in bloom, and but a small variety of fruits matured. The saloon was quite crowded with visitors. Among the objects shown, some of interest only will be noticed. In Robert Buist's collection of plants were *Jasminum tenuifolium*, of recent introduction, and shown for the first time; it is a beautiful, delicate species of that favorite genus; two seedling Gloxinias, remarkably fine and much admired—No. 1, bore flowers of a delicate blush with a white throat; No. 2, scarlet, with throat white, edged with crimson. *Magnolia Exmouthii*, a dwarf plant, bearing very large flowers; some dozen specimens of Pelargonia and as many Gloxinias, with Ericæ, formed the collection. From James Dundas' houses were three plants of *Cereus grandiflorus*, each bearing expanded flowers—Gloxinias, Lilies and Fuchsias. Thomas Meehan, gardener to A. M. Eastwick, (Bartram's garden,) sent fine seedling Calceolarias, handsome Fuchsias, and other plants, with three specimens of Chrysanthemums in flower, which he by management has bloomed in the summer season; the mode of culture by which he effected this result, he reported to the society in an interesting communication.

On the fruit tables, were six pots of grape vines in full bearing, grown from single eyes, one year old, from C. Cope's (President) houses, of the Black Hamburg, Lashmere's seedling, white and grizzly Formtignac, white Constantia and white sweet water varieties, forming a spectacle of much attraction; from same source, was a very large specimen of the La Mercier cherry. Dr. Brinckle exhibited fine specimens of nine varieties of his seedling Raspberries, several of which were of surpassing excellence. Isaac B. Baxter, beautiful specimens of Brinckle's Col. Wilder Raspberry, large Gooseberries, the Guigne noir, June Duke and Portugal cherries. John R. Brinckle presented a fine display of cherries of the following kinds—

Amber, Bigarreau, Gros Cœuret, Black Tartarian, Burr's Seedling, Downton, Napoleon Bigarreau, Reine Hortense, and a seedling. John Perkins several varieties of cherries—fine Amber, Black Eagle and other kinds of cherries; and Hovey's seedling strawberries were seen. Four tables well spread with fine vegetatables were shown. THOS. P. JAMES, Rec. Sec.

HARTFORD CO. HORTICULTURAL SOCIETY.—At the annual meeting of the Hartford County Horticultural Society, the following officers were chosen for the year ensuing, and it was voted that a list of the same be forwarded for publication in the Horticulturist:

President—ALFRED SMITH.

Vice Presidents—Wm. W. Turner, Henry Mygatt.

Rec. Secretary—Gurdon W. Russell.

Cor. Secretary—John J. Butler.

Treasurer—Erastus Smith.

Auditor—T. H. Holcomb.

Standing Committee—Wm. W. Turner, Dr. H. A. Grant, P. D. Stillman, Joseph Winship, George Beach, jr., Dr. T. S. Comstock, Dr. Gurdon W. Russell, John H. Goodwin, H. W. Terry, E. A. Whiting, Chas. P. Wells, H. L. Bidwell, Charles L. Porter and Henry Affleck. Yours, &c., GURDON W. RUSSEL, Rec. Sec'y. *Hartford, June* 24, 1851.

CLEVELAND HORTICULTURAL SOCIETY.—This Society held its first meeting for the season on Wed'y, May 14, 1851. J. Gallup in the chair.

On motion, A. McIntosh—*Resolved*, That we now proceed to the election of officers for the ensuing year.

On counting the ballots, the following gentlemen were declared duly elected:

President—Maj. S. H. WEBB, of Newburg.

Vice Presidents—Dr. J. P. Kirtland, of Rockport; Col. H. H. Coit, of East Cleveland; Wm. D. Beattie, of Cleveland; Jno. Kirkpatrick, of Ohio city.

Cor. and Rec. Secretary—J. F. Hanks.

Treasurer—J. Stair.

Librarian—B. H. Stair.

Committee on Trees and Shrubs.—G. Hoadler, J. Houghton, J. Kirkpatrick.

Comm. on Entomology—Beattie and Hanks.

Committee on Finance and Library—Younglove, Payne and Brown.

Committee on Fertilizers—Case and Cassels.

On motion, Maj. Webb—*Resolved*, That Mrs. Wm. Smyth, Mrs. J. A. Harris, Mrs. C. D. Brayton. Miss Jane Blair and Mrs. John Shelley are hereby constituted a Floral Committee for the ensuing year, whose duty it shall be to notice new, rare and extra grown specimens of flowers, and prepare a report of the same, to be published with the proceedings of the annual exhibition.

On motion, J. Houghton—*Resolved*, That J. Hoadley, J. Gallup, J. Houghton, J. Stair, J. Kirkpatrick, A. McIntosh and W. W. Custead be a committee to prepare a list of premiums, to be awarded at the annual exhibition, to report at our next meeting on the 7th of June.

On motion, J. Stair—*Resolved*, That, in common with our fellow-citizens generally, we deplore the sudden and unexpected decease of our late worthy President, C. D. Brayton, M. D., who, for many years, was an active and very efficient member of this Society; promoting largely its interests and prosperity by his presence, counsels and contributions.

Resolved, That Messrs. Webb and Hanks be a committee to present the heartfelt condolence and sympathy of this Society to Mrs. Brayton and her afflicted family.

On motion, G. Hoadley—*Resolved*, That Messrs. J. Stair, Webb and Hanks be authorized, should it become necessary before our next meeting, to dispose of the Horticultural Rooms, according to their best judgment.

J. F. HANKS, Sec'y.

CHESTER CO. (PA.) HORT. SOCIETY.—The June exhibition of this Society was held at their Hall in Westchester, last week. The efficient officers and managers of the institution had spared no pains to fit up the building in the most tasteful and convenient manner for the accommodation of the lovers of Flora, mechanics, artists and manufacturers—as well as for the accommodation of visitors.

Some account of the numerous articles which were presented, with most of the premiums, will be found in the Record to day, under our Horticultural Department. It is necessarily imperfect, as indeed no pen could do justice to the many beautiful specimens of natural objects, arranged and prepared by the hand of beauty and taste. There were magnificent specimens of green-house plants—and numerous designs of flowers, shrubs, grasses and vegetables. The atmosphere was fragrant with the perfume of the flowers, and at the same time vocal with the songs of birds and the noise of the fountain. There were some beautiful specimens of moss work, and also grottoes of shell which could only be fully admired by being carefully studied out and examined. The needle work adorned various parts of the Hall, exhibiting many rich designs wrought out with a taste and judgment that could be looked for only in the cultivated minds of the gentler sex. The walls of the building were adorned with a number of exquisite paintings in water colors and *pastil*, reflecting great credit upon the artists. In the department of wax flowers and vegetables, and artificial paper flowers, there was a brilliant variety. In the department of fruits and vegetables—of cherries, apples, strawberries, beets, cabbages, potatoes, &c. &c., there were numerous specimens, creditably sustaining this department of the exhibition. But we did not design to go into detail; we refer to our Horticultural Department for additional particulars. —*Village Record.*

Mount Fordham—the Country Seat of Lewis G. Morris, Esq.—(See p. 372.)